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ABSTRACT

This report describes efforts to test a model of leadership effectiveness that centers on "macro variables" and "discretionary leadership." Macro variables were represented by the complexity of the environment, context, and structure of a unit. Discretionary leadership was defined as influence over and above that typically vested in a managerial or command role. Empirical testing used a mixture of mail questionnaires and secondary data concerning 68 telecommunications units of the Army Seventh Signal Command. Using correlation and regression analysis, six major propositions and two exploratory aspects of the model were investigated. The results were as follows: (1) greater complexity was associated with more discretionary leadership; (2) structural complexity wa directly related to unit performance; (3) discretionary leadership was more closely related than traditional leader behavior to both performance and employee maintenance; (4) as complexity increased, more discretionary leadership was needed; (5) selected group characteristics did not alter the relationship between leadership and criteria; and (6) the expertise of the unit made no difference in the effectiveness of discretionary leadership. Theoretical extensions and specific applications are discussed in addition to supplementary supporting data. (Author/TE)

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Technical Report 520

A MULTIPLE INFLUENCE MODEL OF LEADERSHIP

J.G. Hunt, R.N. Osborn, and H.J. Martin
Southern Illinois University of Carbondale

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This report describes efforts to test a model of leadership effectiveness which centers on "macro variables" and "discretionary leadership" (DL). Macro variables were represented by the complexity of the environment, context and structure of a unit. Discretionary leadership was conceptually defined as influence over and above that typically vested in a managerial or command role. Empirical testing used a mixture of mail questionnaires and secondary data concerning 68 telecommunications units of the Army Seventh Signal Command. Using

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correlation and regression analysis, six major propositions and two exploratory aspects of the model were investigated. The results of the propositional tests were: (1) greater complexity in the structure of the unit was associated with more discretionary leadership; (2) structural complexity was directly related to employee maintenance (employee maintenance included several measures of satisfaction and attachment to the system) and environmental complexity was marginally related to unit performance (unit performance included machine error rates in messages sent); (3) discretionary leadership was related to both performance and employee maintenance and associations were clearer than for more traditional measures of leader behavior; (4) generally, as complexity in macro variables increased, more discretionary leadership was needed to achieve higher performance and employee maintenance; (5) selected characteristics of the group being supervised did not alter the relationship between leadership and criteria; and (6) the expertise of the unit did not make a difference in the effectiveness of discretionary leadership. Empirical extensions suggested that lateral leadership was potentially important, particularly in combination with macro variables. Also, the model predicted substantial portions of criterion variance even though the research design was based on a strong inference approach. Theoretical extensions and specific applications are discussed in addition to supplementary supporting data.

Technical Report 520

A MULTIPLE INFLUENCE MODEL OF LEADERSHIP

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FOREWORD

The Leader Development Team of the Leadership and Management Technical Area, U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), performs research and development in areas pertaining to improving the efficiency and operating effectiveness of Army organizations. Of particular interest is work directed at providing the basis for improved frames of reference for leader development to enable leaders better to cope with the changing demands of complex and stressful environments. Improved leader effectiveness is, in turn, aimed at improving the capacity of their organizations to adapt and perform effectively. The essence of the development is determining the key leader skills and attributes that best serve this purpose.

This Technical Report provides a strong inference test of a frame of reference that views leadership in systems terms, and relates leader performance to organizational performance as a function of coping with complexity in its environment.

The research effort is responsive to the requirements of RDT&E Project 2Q161102B74F, Leadership and Management Technical Area of the FY 79 ARI Work Program.

JOSEPH ZEIDNER
Technical Director

A MULTIPLE INFLUENCE MODEL OF LEADERSHIP

BRIEF

Requirement:

The development of effective leader training requires that the training developer make assumptions about what constitutes effective leader performance in organizational settings. Traditionally, these assumptions have focused on the leader and the attributes of successful leaders. A somewhat broader focus has included the attributes of the leader's subordinates and the subordinates' individual tasks. Typical findings from research with a focus on the leader and subordinates reaffirm the importance of leader behavior to group performance, but not much evidence for predictive validity from leader training designed to produce increased skills or changed attributes in leader behavior dimensions. The present research uses a different point of departure. Given the assumption that effective unit performance requires successful adaptation of the unit to the unit specific demands, constraints and opportunities, the moderating effect of leader behavior in the effective unit should be to increase adaptation. Consequently, more effective units should have leaders who effectively act to increase adaptation, using influence beyond the specifications of their position-descriptions (discretionary leadership). Leaders who do not perform this discretionary function should have less effective units. The research in this report was designed to test propositions relating to these assumptions.

Procedure:

The requirement for discretionary leadership is assumed to be generated by variation in environmental and organizational factors (macro variables). Macro variables measured were environmental complexity (general and specific), contextual complexity (size, technological sophistication, and technological variability), and structural complexity (vertical specialization and control, horizontal specialization and coordination, and diversity). Group and task variables included cohesiveness, task difficulty, and task variability. Unit outcomes were various measures of unit performance, (e.g., error rate) and employee maintenance (e.g., subscription to unit and Army goals). Data were collected from Army Telecommunications Units (TCCs) which were selected to have similar missions, context, and structure, with unit outcomes heavily controlled by their machine-ascendant technology. Within TCCs, the sample was restricted to supervisory and management personnel involved in message sending and receiving. Data were collected by questionnaires. A total of 75 TCCs with two and three-level supervisory chains was selected. Performance criteria were machine derived measures of error rate and down time, and the variability of these measures over a six month period of time. Because these performance measures were presumably machine controlled, leadership effects could be minimized and the variation of such effects in relation to leadership thus could be a strong inference test of the multiple influence model of leadership.

Findings:

Supervisors differed in the degree of discretionary leadership (DL) they exercised. Further, situations differed in the amount of DL apparently required for a high level of performance by the unit as a whole. In units with more complex vertical and horizontal structures, a higher level of DL was required to maintain a high level of unit effectiveness and a high level of employee maintenance. A similar situation occurred with internal environment and context. As these became more complex, a higher level of DL was required. When comparisons were made between the predictive effectiveness of the Multiple Influence Model and conventional leadership models, more of the variance of performance effectiveness was explained by the Multiple Influence Model.

Utilization of Findings:

These findings have important implications for the design of leadership instruction. Rather than focusing on leadership style and leader attributes, the focus of leadership instruction should be on the functional role of the leader in facilitating the adaption of his unit to environmental challenges. When the environment, context, technology, or structure push the design limits of the unit, leaders must go beyond the formally prescribed bounds of the officially described job, to develop ways of dealing with the contextual or environmental complexity that momentarily has exceeded the capacity of his subordinates. This requires the leader to diagnose the problem accurately, and act to reduce the complexity appropriately. With this orientation, leadership training becomes less subordinate centered and more systems centered.

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A MULTIPLE INFLUENCE MODEL OF LEADERSHIP

INTRODUCTION

The final technical report of grant DA CH 19-78-G-0010, "A Multiple Influence Model of Leadership," is divided into three main parts. The first part, "Managerial Summary," is designed for those not familiar with the leadership literature. The second part, "Details of the Study," provides a more traditional academic treatment of the project. It also contains a more lengthy discussion of applications than does the Managerial Summary. The final part consists of four "Technical Appendixes" which focus on particular aspects of the investigation. Appendix A outlines the pilot studies conducted to develop a reliable and valid measure of discretionary leadership. Appendix B details procedures used to collect the questionnaire data which underly the empirical examination of the model. Important here are several changes made to increase the return rate from some 25% to about 90% of the potential participants. Appendix C lists the items, by concept, used in the questionnaire. Finally, Appendix D provides data which may be useful in replicating the analysis and judging selected technical aspects often considered important in leadership research.

ABSTRACT

Efforts to test a model of leadership effectiveness which centers on "macro variables" and "discretionary leadership" are reported. Macro variables were represented by the complexity of the environment, context, and structure of a unit. Discretionary leadership was conceptually defined as influence over and above that typically vested in a managerial role. Empirical testing used a mixture of mail questionnaires and secondary data concerning 68 telecommunications units of the Army Seventh Signal Command. Using correlational and regression analyses six major propositions and two exploratory aspects of the model were investigated. The results of the propositional tests were: (a) Greater complexity in the structure of the unit was associated with more discretionary leadership; (b) structural complexity was directly related to employee maintenance (employee maintenance included several measures of satisfaction and attachment to the system) and environmental complexity was marginally related to unit performance (unit performance included machine error rates in messages sent); (c) discretionary leadership was related to both performance and employee maintenance and associations were clearer than for more traditional measures of leader behavior; (d) generally, as complexity in macro variables increased more discretionary leadership was needed to achieve higher performance and employee maintenance; (e) selected characteristics of the group being supervised did not alter the relationship between leadership and criteria in the direction expected; and (f) the expertise of the unit did not make a difference in the effectiveness of discretionary leadership. Empirical extensions suggested that lateral leadership was potentially important, particularly in combination with macro variables. Also, the model predicted substantial portions of criterion variance even though the research design was based on a strong inference approach. Theoretical extensions and specific applications are discussed in addition to supplementary supporting data.

MANAGERIAL SUMMARY[1]

The purpose of this project was to refine and partially test a new theory of leadership. For a number of years leadership theorists have been examining the conditions under which specific types of leaders and leader behaviors yield the most favorable balance of performance and employee maintenance.[2] There is a general consensus among leadership researchers that the behavior of the leader should be adjusted to key "contingencies" or situations. No one particular pattern of leadership is always effective and no magical set of traits automatically separates effective from ineffective leaders.

Unfortunately, there is little agreement as to which conditions are critical contingencies and why some leaders appear to develop a successful leadership pattern while others do not. Most studies have concentrated on individual leader characteristics, the particular tasks of subordinates, and a whole range of psychological characteristics. While these psychological factors are likely to be more important in a more general understanding of leadership and followership, it is also possible to examine the leader as a member of a complex organization. As such the leader is expected to perform specified duties, supervise subordinates and insure the smooth operations of his or her unit. As a member of an organization, the leader is selected for subordinates and also must act as a follower. Viewing the leader as an organization member leads to a different picture of the leader and leadership than is often found in the academic literature. It led to the development of what we have called the "Multiple Influence Model of Leadership."

Basic Tenants of the Theory

The theory concentrates on only a small portion of the leader's total interactions with subordinates. Much of the day-to-day contact between leader and follower is tightly constrained by the organization. In different terms, the boss is required to supervise subordinates. While good supervisory practices are needed, they are not leadership. Leadership is influence the individual builds over and above that typically provided by

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[1]This investigation was supported by grant DA CH 19-78-G-0010 from the United States Army Research Institute for the Behavioral and Social Sciences to Southern Illinois University at Carbondale (J. G. Hunt and R. N. Osborn, Principal Investigators). We would like to thank Anant Balarum, Paul Brown, John Benandi, Kevin Lindsey, and James Tracy for assistance in data gathering and analysis. We would also like to thank T. O. Jacobs, ARI-Alexandria, and Steven Stewart, ARI-Leavenworth, for helpful critiques and suggestions.

[2]Employee maintenance is the term used to describe those variables concerned with attracting and maintaining a viable work force. Here, measures tapping job satisfaction, involvement, intent to leave, equity of system rewards, unit goal congruence, and system goal congruence were used.

a particular position. Since our definition is somewhat different than most, we have used the term discretionary leadership.

The theory attempts to both help explain why a leader acts in a particular manner and what leadership actions are effective under different organizational conditions. Thus, one portion of the project centered on explaining discretionary leadership. The theory suggests that the leader responds to specific opportunities and problems which the unit is not designed to handle. All units are designed to handle some set of routine problems and are structured to cope with typical conditions. Yet, no unit is typical in all respects.

Leaders are expected to respond with discretionary leadership to small variations in the environment and a number of organizational characteristics of their unit. While common sense would suggest this, the key in the Multiple Influence Model is that specific, measurable environmental, and organizational conditions are identified as important. Further, specific aspects of discretionary leadership are expected to vary systematically with variations in environment and organizational conditions. For instance, leaders in units where more rules, policies, and procedures are used, were expected to and did respond with discretionary use of rules and procedures.

Just helping to explain why a leader attempts to influence subordinates in a particular manner is not enough. For application of the approach, it is also necessary to understand the specific actions the leader should take to improve unit success (performance and employee maintenance). This is by far the most challenging aspect of the model.

It is necessary to link specific measurable conditions to distinct dimensions of discretionary leadership to explain and predict various aspects of unit success. Yet a "good" theory should provide a few key guidelines which can be applied to specific circumstances. The Multiple Influence view suggests the following: discretionary leadership which complements the problems and opportunities of the unit will yield greater unit success.

The key term in this guideline is complements. The successful leader recognizes the impact that minor modifications in the environment and structure of the unit have on unit performance and employee maintenance. If the modification(s) improves the chances for unit success, then the effective leader will exploit this advantage with discretionary leadership. Likewise, where the variation threatens success the leader should counter with discretion.

Since the opportunities and problems encountered by a particular unit are likely to be unique, it was necessary in this study to develop a few comprehensive measures to specify where the leaders should concentrate their efforts. Indexes were developed to measure the complexity of the environment of the unit, the complexity of the context for mission accomplishment, and the complexity of the organizational structure. Each of the three complexity indexes reflects the magnitude of the problems and opportunities expected to be encountered from a particular source.

It should be noted that the complexity measures were developed so that planners at higher levels could estimate the complexity facing a particular

unit. For assured success the key is to concentrate on measurable and identifiable conditions. For instance, the size of the unit is one component of what is called contextual complexity.

Beyond the basic examination of the Multiple Influence approach, the project also incorporated three exploratory modes. First, many current approaches emphasize the importance of selected group conditions, such as cohesiveness, and the tasks of subordinates. The Multiple Influence approach would gain more acceptance and would be more easily tied into existing research if group and task conditions could be incorporated. Thus, some frequently used aspects of group and task characteristics were examined in the Multiple Influence framework.

Second, an attempt was made to investigate the lateral leadership of the unit head. While most leadership theories concentrate solely on superior-subordinate relations, exchanges among leaders at or near the same organizational level were also considered important.

Finally, the various components comprising the Multiple Influence Theory were combined in a series of comprehensive multivariate global statistical models to determine the total proportion of variance predicted by the model. In this way an idea of the overall predictive utility of a broad-based leadership model could be obtained.

These three extensions help link the Multiple Influence approach to existing research and point to new frontiers.

In sum, the Multiple Influence Model of Leadership attempts to explain and predict two important organizational phenomena. Why do leaders act as they do? What leader behaviors are needed to increase the success of the unit? Leadership is separated from supervision. The emphasis is on the discretion the leader builds over and above the requirements found in a particular position.

It is expected that leaders will respond to minor modifications in environmental and organizational conditions with discretionary leadership. Further, those leaders whose discretionary leadership offsets negative forces and reinforces positive features of the environment and organization will head more successful units. In this study, all environment and organization conditions were measured in such a way that knowledgeable higher officials could estimate the unique conditions facing a particular unit. Thus, there is the long term opportunity to more completely manage unit operations by altering environmental and organizational factors to increase the leadership effectiveness of a particular unit head. Application, however, is dependent upon successful testing of the theory. The current project begins this testing and refinement. Further, it examines three related issues concerning the incorporation of selected group and task variables, the lateral leadership of unit heads, and the total proportion of variance accounted for by a comprehensive organizationally based leadership model.

Research Strategy

A complete examination of all aspects of the proposed Multiple Influence Model was considered too costly and time-consuming for the Army Research Institute Themes program. Instead a cost-effective strategy designed to test key aspects of the model was devised. First, it was essential to develop a direct estimate of discretionary leadership. This was accomplished by successive revisions of modifications to previously developed instruments in several pilot samples.

Second, careful attention was given to the sample used to investigate the approach. Specifically, a search was conducted for a combination of units with the following characteristics: (a) hard performance data on the operations of the units should be available; (b) there should be a wide variation in the geographical setting of the units to reflect the global operations of the Army; (c) unit size should be at least moderately variable; (d) technology should be constrained and there should be consistency in the mission; (e) the structure of the units should be similar but not identical; and (f) the performance of the units should be vital to successful Army operations.

These characteristics would provide a rigorous test of the approach in regard to those factors with little variation when predicting unit success. Any significant findings would be considered important. In the jargon of the field, design could employ the approach of "strong inference." The more classical design approach was used to investigate relationships involving a unit's environment, where there was expected to be considerable variation.

Environmental variations were expected to require somewhat different leadership patterns for successful unit performance and employee maintenance. Yet only a handful of studies have even considered the problems facing an organization which must continually transfer key personnel into a wide variety of geographical settings, let alone examined leadership within these differing environments.

The combination of environmental conditions and leadership was considered particularly important for predicting employee maintenance. With the assistance of the Army Research Institute, telecommunications units in the Seventh Signal Command were identified as meeting all the requirements. Further, this sample offered several other interesting features. Telecommunications units are staffed by a mix of military and civilian personnel with supervisors who are both male and female. The high literacy rate minimized problems of a questionnaire approach and these units are among the more technically advanced units in the Army. Finally, and perhaps most important, the performance measures used to evaluate units were designed to be as immune to leadership differences as one can imagine. Almost all the units sampled use fully automated equipment which prevents most operator errors. If the Multiple Influence Model predicts under these conditions, it might well be expected to have even greater predictive capacity in less machine controlled settings.

Results

The first phase of the project was to develop an instrument for measuring discretionary leadership. The strategy was to build upon a previously well developed and widely used leadership instrument. The original hope was to cut the development time and cost. Unfortunately, data from three pilot samples revealed that this measure was not a good base and that development of an appropriate measure would be more costly and time-consuming than originally anticipated. The Army Research Institute granted an extension, without additional cost, to work with representatives of the Seventh Signal Command to refine the instrument and develop an appropriate way of securing an adequate return rate from mail questionnaires administered to telecommunications personnel. The additional time was used to modify the instrument and develop appropriate questionnaire administration and follow-up procedures. Results for both were favorable. A measure for estimating two important dimensions of discretionary leadership was successfully developed and the questionnaire return rate was approximately 90%.

To summarize, the first phase was successful even after some initial difficulties. It is possible to measure the discretionary support provided by the leader along with leader discretionary rules and procedures. The instrument meets generally accepted measurement standards for reliability and validity.

Results showed substantial support for the model. Also, two aspects of the exploratory investigation appear promising. The body of the report details the findings and implications. However, they are summarized here in less technical terms. Six propositions were examined.

In Proposition 1, it was proposed that discretionary leadership would be sensitive to variations in environmental and organizational conditions. Three indexes designed to reflect problems and opportunities in three distinct areas were formulated. Environmental complexity reflected problems and opportunities outside the units. Contextual complexity was a combined measure of problems and opportunities emanating from size and technological factors. Structural complexity was a combined estimate for problems and opportunities associated with vertical specialization and control issues, horizontal specialization and coordination, and, finally, diversity in the vertical and horizontal specialization. By design, both contextual and structural complexity were to be similar across the sample of telecommunications units.

As expected, discretionary leadership varied systematically with structural complexity. Such a relationship was not found when a less sophisticated indicator of leader behavior was used nor was it found for environmental or contextual complexity. Thus, Proposition 1 received mixed support.

Proposition 2 dealt with the impact of environmental, contextual, and structural conditions on unit performance and employee maintenance. Complexity in the unit's specific environment was related to performance but not employee maintenance. Complexity in the general environment was unrelated to unit outcomes. Context was not related to performance or employee maintenance in this sample. It should be remembered that size and technology

were virtually identical across the sample units by design. Small variations in structure were related to employee maintenance but not to unit performance. Employees preferred more structural complexity, particularly in the form of more vertical specialization and control. In different terms, greater vertical specialization provided a better match between the required mission and technology than a less formalized and less specialized structure.

Proposition 3 predicted that discretionary leadership would be positively associated with unit performance (error rate in messages sent and machine down time) and employee maintenance (satisfaction, involvement, intent to leave, perceived equity of system rewards, agreement with unit goals, and agreement with system [Army] goals). Discretionary leadership was positively related to both performance and employee maintenance. Thus, as predicted, leaders with more discretionary leadership headed more successful units. When using gross estimates of leader behavior, no such relationship was found concerning performance. Hence, discretionary leadership was a significant predictor and traditional leader behavior was not.

Proposition 4 was the most difficult test of the model. It predicted that discretionary leadership which complemented environmental, contextual, and structural complexity would lead to greater unit success. A pattern of significant interactions for both unit performance and employee maintenance supported this contention even though the machine-controlled performance measures were not expected to be influenced very much by leadership. Results were stronger for employee maintenance than for performance, and not all aspects of employee maintenance responded to a complementary pattern of discretionary leadership. Adjusting discretionary leadership to complement environmental complexity was important for gaining higher employee satisfaction, lower intent to leave, agreement with goals, and one aspect of consistency in unit performance. When discretionary leadership complemented contextual complexity, there was to be found more consistent unit performance. Complementing contextual complexity did not make a difference when predicting employee maintenance criteria.

As structural complexity increased, it was particularly important for the leader to increase discretionary leadership if higher satisfaction, less intent to leave, and more consistency in performance were desired.

Propositions 5 and 6 dealt with the possible combined effects between group and task conditions, on the one hand, and discretionary leadership on the other. This exploratory effort to link our approach with others was not successful. There were significant interactions, but they were inconsistent with the projections of existing models.

In terms of additional exploratory work, the incorporation of lateral leadership was found to be important when predicting unit performance. However, it was not as consistently related to employee maintenance. Particularly important was the need for more lateral leadership as the environment, context, and structure became more complex. Overall, as complexity increased, leaders willing to devote more time and effort to lateral relations generally experienced higher unit performance and employee maintenance.

In terms of prediction with a series of global models combining the variables across propositions, squared correlation values ranging from between .20 and .80 were found, depending upon the criterion. These values suggest that organizationally based leadership models such as this one appear to have considerable predictive potential.

The body of the report discusses the above findings, outlines some important considerations in future research, and provides considerable detail concerning application of the model. We can summarize two key portions of the applications. First, the overall predictive ability of the global model appears sufficient to be of practical significance in terms of applications.

Second, modifications in specific aspects of the environment, context, and structure of the unit can be used to minimize the importance of leadership, maximize the leader's role, or provide some balance between these extremes. Consistency in environment, context, and structure is the key to minimizing the importance of leadership. Where there is inconsistency across units, discretionary leadership is important. More discretionary leadership is needed to cope with the unusual circumstances.

However, it may not be necessary to embark on expensive leadership training programs to improve the performance of some units. By adjusting components of the environment, context, and/or structure, it is possible to design a minimal degree of inconsistency.

We conclude that the model was generally supported in a difficult test. Environmental, contextual, and structural conditions should be considered in analyses of leadership effectiveness. The Multiple Influence Model of Leadership helps open new avenues to aid planners and decision makers in improving unit success.

DETAILS OF THE STUDY

Purpose and Scope

This part of the report describes the efforts taken to test and expand a new model of leadership. The model differs from more traditional approaches in two major ways at both the theoretical and empirical levels. First, it incorporates macro variables (external environment and organizational variables) and leadership as well as group and individual characteristics, singly and in combination. Second, the model treats leadership as being influenced by these setting variables. Third, it incorporates these setting variables as contingencies. Other models treat leadership as if it were an independent variable not substantially influenced by the setting of the leader. They also do not utilize macro variables to the extent that they are used in the present model.

The theoretical rationale underlying the model is briefly described. Then empirical results are reported for supervisory personnel in Army telecommunications units from the Seventh Signal Command. The empirical results represent a partial test of the model in units with hard performance criteria, with large environmental variations and with relatively constant organizational conditions.

The data reported here show superior criterion predictability compared with more traditional treatments of leader behavior. Implications of these data are discussed for: (a) Army development and training use; and (b) future tests of the model in units with different environmental and/or organizational characteristics from those sampled here.

Background and Theoretical Base

The dominant theme in leadership theory centers on contingencies. In various forms the successful leader alters interactions with subordinates to modify the impact of individual and group conditions. The theme may also be stated as: The impact of leader behavior is altered by individual and group factors so that the successful leader must adjust to these factors or they must be adjusted to the leader. Popular approaches highlight different aspects of leader behavior and different contingencies. In the House approach, the emphasis is on the leader developing an appropriate path toward the goals assigned to the unit and to goals prized by subordinates (House & Mitchell, 1974). In Fiedler's view, the leader's style (LPC) is fixed so that the question boils down to matching leaders and group conditions (Fiedler, Chemers, & Mahar, 1976). Graen and his associates (e.g., Graen & Cashman, 1975), on the other hand, focus on the individual exchanges between a follower and a leader arguing that leader adjustments to individual subordinate characteristics are critical. Normative approaches, such as the one by Vroom (Vroom & Yetton, 1973), suggest when the leader should intervene. The nature of the problems facing the unit and the relative expertise of the leader are key factors.

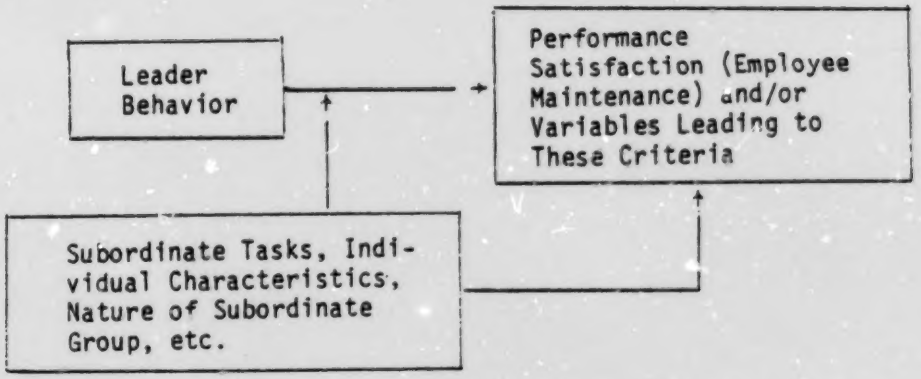
To summarize, most existing approaches pay lip service to more global organizational factors and presume it is not important to explain why leaders act as they do. An exception which helped form the theoretical underpinnings of the current approach is work by Bass and his associates (e.g., Bass & Valenzi, 1974). Their approach builds upon systems theory while the present model is rooted in organization theory.

The Multiple Influence Approach

Our approach, termed the Multiple Influence Model of Leadership explicitly considers macro variables and attempts to help explain why leaders act as they do. The leader is the individual who stands between and links the organization and subordinates (e.g., Jacobs, 1971; Likert, 1961). Since organizational conditions shape the problems and opportunities facing the unit and its members, they also alter the leadership pattern of the unit head and the effectiveness of a particular series of influence attempts. To these macro factors one should add group and task characteristics (Fiedler, 1967), as well as subordinate individual characteristics (cf. House & Mitchell, 1974). As shown in Figure 1, however, our approach places emphasis on the macro variables. More traditional approaches do not.

To more clearly understand the role and impact of leader behavior, it is necessary to dissect it into different components. Typically this has been accomplished by looking at different dimensions of leader behavior such as supportive versus task-based influence attempts. Our perspective

Most Contingency Approaches


Leader Behavior
Performance Satisfaction (Employee Maintenance) and/or Variables Leading to These Criteria
Subordinate Tasks, Individual Characteristics, Nature of Subordinate Group, etc.

Multiple Influence Approach

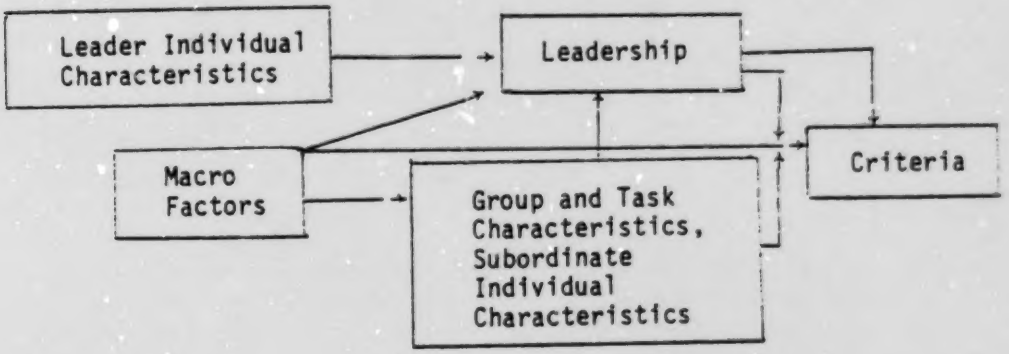


Figure 1. Key relationships stressed in contingency approaches and the Multiple Influence approach to leadership.

of the leader as a link between subordinates and the organization suggests a more fundamental distinction. Leader behavior is composed of required interactions and discretionary leadership. When these two are separated, we propose that the associations among environmental conditions, organizational factors, leadership, unit characteristics, and goal attainment will become clearer. The implications of such a view are far-reaching. For instance, by modifying selected variables, organizations could alter the behavior of leaders and the success of different patterns of discretionary leadership. Such a possibility is not articulated in existing models. Thus, it is appropriate to discuss discretionary versus required (nondiscretionary) leadership and then move on to specific macro variables.

Discretionary and Required Leadership

As a member of the organization, each leader is required to interface with subordinates in some minimal fashion. Required leader behaviors are those minimal interactions with subordinates dictated by the position of the leader in the organization's hierarchy. Leaders at the same level and heading units with similar missions, environments, contexts (size, technology), and structures (vertical specialization and control and horizontal specialization and coordination) are likely to share similar supervisory requirements. For instance, the classic image of the DI clearly suggests that there is a common set of required interactions with recruits. Major differences in mission, environment, context, or structure of the unit call for a different set of required leader behaviors. This can often be seen in job descriptions and specifications.

Discretionary leadership, on the other hand, is influence over and above that typically vested in the role. Influence attempts embodied in the role are akin to what Jacobs (1971) has conceptualized as "supervisory behaviors." Discretionary leadership is influence beyond requirements.

In the Multiple Influence approach, we see three broad factors leading to discretionary leadership. First is the set of macro circumstances (environmental, organizational, and mission characteristics) facing the individual leader. Second is the leader's set of personality and other individual difference variables. Third are the characteristics of the leader's subordinates (individually and as a group). The latter two factors have, to a greater or lesser extent, been mentioned in existing contingency approaches (Hunt & Larson, 1974). They will not be discussed in depth here since they are not a central focus in the present investigation. The role of environmental and organizational factors, however, deserves more careful attention--particularly the interplay among macro factors and discretionary leadership.

Macro Factors and Leadership

Even though leaders may hold similar roles in units with similar missions, they are unlikely to face identical environmental and structural conditions. The required or nondiscretionary subordinate interactions may mesh well with typical conditions but be inadequate in units with

slightly varied environmental and organizational conditions. It is expected that the individual leader will move to fill gaps between required leadership and existing environmental and structural conditions to provide greater consistency. Let's examine this drive toward consistency.

Large organizations develop formal structures and processes to accomplish unit objectives assuming typical environmental and contextual conditions. However, goals, sizes, technologies, and even structures may vary on a unit by unit basis. No unit is the typical unit any more than the average American family has 3.4 members. Leaders are expected to react to unique unit conditions. We propose, for example, that where existing structures and procedures are inadequate, the leader will be expected to become more active and add rules and procedures. Where unusually inconsistent demands develop, the leader is expected to add role clarity. Where there are heavy pressures for performance, the leader is expected to increase his/her support of subordinates. To summarize, the leader is expected to alter discretionary leadership to fill gaps and inconsistencies between unique unit conditions and those typically found in similar subsystems.

We should note that these adjustments may or may not be done to increase unit performance or subordinate employee maintenance variables.[3] They may be done for a variety of reasons including easing the burden on the leader, insuring consistency of treatment of subordinates and outsiders, and/or to enhance the leader's chances of promotion. Further, not all leaders may respond to unique conditions by altering the interactions with subordinates. It is expected, however, that those who do respond are more likely to head units with more favorable unit outcomes. As explained later, some adjustments to unique factors are expected to help promote assumed equality of treatment across similar units in terms of the requirements, constraints, and resources given in exchange for performance and employee maintenance.

Precisely how leaders adapt to variations in environment and organizational factors is a major question for the present research. The theory suggests the following proposition.

> Proposition 1: Leaders adjust their discretionary leadership to meet unique variations in the environment, context, and structure of their unit.

Related to this proposition is a more stringent analysis of the ability of discretionary leadership to more clearly reflect why leaders act as they do. Specifically, the pattern of associations between macro factors and discretionary leadership should be clearer than those between macro factors and the more traditional gross estimates of leader behavior. To more fully examine this general proposition, it is also useful to include an estimate

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[3] We use the term employee maintenance to reflect a group of variables involved in attracting and maintaining an adequate workforce. In addition to satisfaction, these include such variables as job involvement, organizational commitment, and the like.

of required leadership. This will allow for a more complete comparison of results between traditional approaches and the Multiple Influence Model.

Specific Macro Factors

The first proposition raises the question of which macro factors are important. The potential number of important environmental, contextual, and structural variables is quite large. Although each subsystem with an identical mission may be formally designed in the same manner and operate under a common policy umbrella, subtle differences are likely to emerge. Many of these are likely to be unique to a particular unit. For instance, units with similar missions may still not interact with an identical set of other units. To cut through the potential maze and still maintain an approach which provides opportunities for emergent differences, we have adapted a theoretical framework receiving some popularity in the organization theory literature.

Environmental Conditions. As we have indicated, many of the more important macro influences may be divided into environmental, contextual, and structural categories. The environment may be further divided into general and specific segments. The general environment includes environmental characteristics common to all organizations operating within a particular geographical area (e.g., Washington, St. Louis, Nevada). Here interdependence, volatility, and development or favorability in economic, legal-political, sociocultural, and educational conditions have been found to be related to several aspects of unit success (Osborn, Hunt, & Jauch, 1980). For simplicity, interdependence, volatility, and favorability can be multiplicatively combined into an index of overall complexity in the general environment (Osborn, 1976; Osborn et al., 1980).

The specific environment consists of the other units with which a given organization or unit works to reach its mission. Using an instrument developed by the senior authors (discussed in more detail in the method section), it is possible to rate the interdependence, volatility, and favorability in this sector as well. A summary index for complexity in the specific environment can also be calculated in the same way as for the general environment. Finally, all environmental conditions measured can be represented by a single multiplicative environmental complexity score where higher complexity denotes more problems and opportunities for a particular organization (Osborn et al., 1980).

Contextual Conditions. In much the same manner, we can rate the context of a given organization. The context consists of those conditions in which the organizational structure and managers operate. In those units with similar missions, such as those in this study, the key contextual elements are size, technological sophistication, and technological variability. Larger units provide leaders with both more resources and more followers. Technological sophistication is concerned with the intricacy of transforming inputs (e.g., raw material) into outputs (e.g., products). It is measured in different ways depending on the specific type of technology involved. For instance, for one kind of technology, measurement centers on the ratio of capital to labor. For another type, it involves the difficulty of linking different parties to a transaction (Osborn et

al., 1980). Technological variability is concerned with the range of outputs provided and the extent to which members perform similar duties.

Differences existing in units along these contextual variables are expected to be related to discretionary leadership. As with the environmental variables, it is possible to develop a complexity index reflecting the problems and opportunities facing an organizational unit from its context (size, technological sophistication, and technological variability). (See Osborn et al., 1980 for details.)

Structural Conditions. For a number of years, scholars have been concerned with the structure of the organization and its effects on unit outcome criteria (see Osborn et al., 1980 for a review). There are several different approaches relying upon either reports from subordinates or descriptions from organization charts. Here, a combined view which includes both is utilized. Specifically the organization's structure can be decomposed into three components: (a) vertical specialization and control; (b) horizontal specialization and coordination; and (c) diversity across a unit's dominant pattern of vertical and horizontal dimensions.

Where the overall mission and design of a system are similar, decentralization and formalization are two key ways to conceptualize an organization's vertical specialization and control. Formalization is concerned with the use of documents for specifying roles, procedures, and controls. Decentralization focuses on the locus of decisionmaking within a given unit. Assuming a given number of levels and job titles, the greater the decentralization (the lower in the organization is the locus of decisionmaking) the greater we assume the pattern of vertical specialization to be. To push decisions down, they must be subdivided and delegated to a larger number of managers--hence more specialization.

Horizontal specialization and coordination may be defined in many ways. Again, assuming a similar design and mission for units in a system, a primary way of considering horizontal specialization and coordination is in terms of the intricacy of within-unit workflow interdependence. The higher the interdependence requirements, the more horizontal specialization is considered to exist.

In addition to vertical and horizontal specialization, a third aspect of structure is diversity across a unit's dominant pattern of vertical and horizontal dimensions. Diversity can be measured by the standardization of job duties and requirements for performance--the less standardization, the more the diversity.[4]

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[4]These three dimensions of structure are not consistently related to one another across samples. It appears they are partial substitutes for one another from the point of view of higher management. For instance, decentralization may be increased with the addition of more specific job descriptions and reports (formalization) or in tandem with written procedures for performing specific duties (standardization). In some instances greater centralization is accompanied by more formalization and standardization to insure tight control by management.

As with environment and context, it is possible to combine these components into an index of structural complexity. The more complex the structure, the more problems and opportunities it can handle. Of course a more complex structure also may require the leader to adjust his or her discretionary leadership.

With these environmental and organizational characteristics in mind, let's take a closer look at the proposed Multiple Influence Model of Leadership. Specifically, how does leadership relate to performance and employee maintenance?

The Multiple Influence Approach and Unit Outcomes

While it is important to understand why leaders act as they do, a model of leadership should also help explain and predict outcomes. In this report we concentrate on unit outcomes rather than those at the individual or oganizational levels. The multiple influence approach builds upon existing contingency models and incorporates macro factors to increase our understanding and ability to predict important aspects of performance and employee maintenance (see Figure 1).

The theoretical arguments can be separated into four categories: (a) the direct (or main) effects of macro variables; (b) the direct association among discretionary leadership, required leadership, and unit outcomes; (c) the interactive (combined) impact of macro variables and leadership (discretionary and required) on unit outcomes; and (d) the combined effects of leadership and group and task conditions.

Macro Variables and Unit Outcomes

The literature concerning the direct association between macro variables and unit outcomes is not clear-cut. Generally it is expected that more complex environments (as defined above) provide greater opportunities for performance while they have a negative impact on employee maintenance. Much the same is generally found for size, technological complexity, and structural complexity (Osborn et al., 1980). These simple associations are often comparatively weak. However, the combined impact of matching degrees of environmental, contextual, and structural complexity is hypothesized to be quite important. Specifically, where environmental, contextual, and structural variables are consistent with unit requirements, both unit performance and employee maintenance are expected to be high. The greater the inconsistency, the lower the performance and employee maintenance (Osborn et al., 1980). Essentially, the argument is that the structure of the organization should be complex enough to take advantage of opportunities provided by the environment and context and sufficiently complex to allow the unit to cope with environmental and contextual problems. For example, large units should have a more elaborate series of rules, policies, and procedures to substitute for personal direction by supervisors than smaller units. Here, the sample units shared a very similar pattern among environment, context, and structure; thus, exploration of the interactive effects among these factors was not deemed to be appropriate. Instead, there was an attempt to assess the direct association of these factors on unit outcomes. Assuming a match has been achieved, a second proposition is:

Proposition 2: Macro variables will be significantly associated with unit outcomes.

Leadership and Unit Outcomes

Even though contingency views now dominate the leadership literature, it is important to remember that leadership may still have a direct, main effect. Generally, more leader activity is associated with higher unit outcomes and the association with employee maintenance is typically greater than with estimates of unit performance[5] (Stogdill, 1974).

Proposition 3: Greater discretionary leadership will have a positive impact on unit outcomes.

It is expected that the direct associations between discretionary leadership and unit outcomes will be clearer than when a typical, gross estimate of leader behavior is used. This is because discretionary leadership is a "purer" measure of leadership than are the more traditional leader behavior measures. We should note that merely meeting organizational requirements is not expected to be directly linked with employee maintenance. Such activities are required of the leader (required leadership). Discretionary leadership, on the other hand, is expected to be associated with employee maintenance since the leader is more actively involved with building linkages between unit personnel and the organization.

Interactive Relationships Among Macro Variables and Discretionary Leadership

The heart of most contingency approaches consists of the interactive relations among leadership and one or a number of nonleadership variables (see Figure 1). The Multiple Influence approach postulates that the leader, via discretionary leadership, should complement the problems and opportunities presented by the macro conditions. Such a leader recognizes the impact that minor modifications in the environment and organization of the unit can have on unit performance and employee maintenance. The leader then responds with the appropriate discretionary leadership.

Specifically, as environmental complexity increases, more discretionary leadership is needed to help provide missing adaptive mechanisms and guidelines not found in a structure designed for typical environmental conditions.

Similarly, as contextual complexity increases, the leader needs to intervene with discretion to provide additional structural adaptation. For example, discretion may be needed to help clarify and justify

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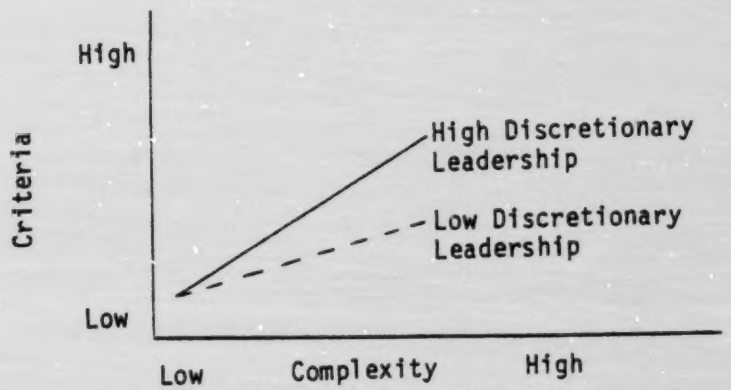
[5] Whether this difference is a true one or an artifact of the same source used for obtaining leadership descriptions and attitudinal measures of employee maintenance is not clear from the available literature.

exceptions facing subordinates and to direct the way in which rules, policies, and procedures apply.

Additional structural complexity would also call for additional discretionary leadership. For example, some rules and procedures may need to be emphasized over others, and additional clarification of duties may be needed. More discretionary supportiveness of subordinates may also be needed to help mold their unique requirements into those of the unit.

In statistical terms, it is predicted that the interaction between discretionary leadership and macro conditions will yield an increase in explained variance for unit performance and employee maintenance. These macro conditions are: environmental complexity, contextual complexity, and structural complexity. The expected interaction is of a particular form. Namely, there will be a greater difference between criterion values for lower and higher discretionary leadership when complexity (environmental, contextual, or structural) is high than when it is low. This is a divergent interaction since the difference in criterion values increases as the macro variables become more complex and high and low discretionary leadership is compared. This is graphically illustrated below in its purest form.



The diagram assumes that additional complexity generally has a favorable impact on criteria. This is what we would predict for employee maintenance type outcomes in highly bureaucratized settings such as the Army. In other, less bureaucratized settings, where the tasks themselves are more varied and challenging, the lines might slope down, rather than up. There would still be increasing divergence between lower and higher discretionary leaders, but complexity would have a negative impact. This argument is consistent with the treatment of Osborn et al. (1980).

This discussion leads to a fourth proposition.

Proposition 4: Unit outcome differences between lower and higher discretionary leadership will increase as environmental, contextual, and structural complexity increase.

Moving now from macro interactions to those at a more micro level, we consider group and task conditions facing the leader.

Group and Task Interactions

There are several group and task characteristics mentioned in the literature concerning leadership effectiveness. Two appear particularly important. First, how cohesive is the group? Second, what is the nature of the task performed by group members?

Group cohesiveness has been mentioned by a number of leadership scholars as a key group characteristic (for a review, see Schriesheim, Mowday, & Stogdill, 1979). High cohesiveness connotes the potential for a more receptive collection of subordinates.

Fiedler's (1967) concept of group atmosphere, where the leader describes the attractiveness of his/her subordinate group, is akin to cohesiveness and reflects this receptivity or favorability.

Conceptualizing a cohesive group as being potentially more receptive, we expect that discretionary leadership will be more important for unit success as cohesiveness increases. In more formal terms, the difference in unit outcomes between higher and lower discretion will be greater as cohesiveness increases.

In terms of tasks, there is substantial support for considering them in terms of structure and predictability (Fiedler, 1967; House & Mitchell, 1974; Melcher, 1976; Van de Ven, 1977). Following Van de Ven (1977), we will conceptualize these key task dimensions in terms of task difficulty and task variability.

For these task conditions, we propose that the leader responds in a particular manner. Specifically, our predictions are largely consistent with House's path-goal model of leadership (House & Mitchell, 1974) and couched in terms of particular dimensions of discretionary leadership. Thus, we propose that as task difficulty increases the leader should increase structuring activities (e.g., greater role clarification and emphasis on rules and procedures) to clarify the path from job problems to performance. At the same time, additional supportiveness is needed as a reward to stimulate the greater effort needed to accomplish more difficult tasks. In contrast, consider the situation where tasks are low in difficulty. Here, higher support may compensate for a nonchallenging job but discretionary clarification and/or emphasis on rules and procedures are not only unnecessary but get in the way of employee maintenance. Thus, excessive structuring may interfere with task achievement and even insult followers when jobs are simple.

In terms of task variability, we propose that greater variation calls for additional emphasis on rules and procedures to clarify subordinate tasks. Along with this, additional supportiveness is needed to compensate for the additional effort needed to cope with the variability. Routine tasks call for the opposite leader responses.

Those familiar with House's path-goal approach recognize that classical interactive relations are postulated for the task-related aspects of leadership. Where leader task direction (role clarification, rules and procedures, work assignments) is needed to solve job problems or clarify solutions to varied demands, greater task emphasis yields greater performance and satisfaction. Where not needed, the task emphasis actually lowers satisfaction.

We can summarize the moderating influence of group and task conditions into a fifth proposition.

Proposition 5: Discretionary leadership will be associated with higher unit outcomes when it complements unit conditions.

As indicated above, for task conditions, a classical (symmetrical) interaction is expected. However, for group cohesiveness, we expect a divergent interaction. Here, the difference in unit outcomes between higher and lower discretion will be greater as cohesiveness increases.

We can also consider an additional group variable but on an exploratory basis since, in general, it has not been treated as thoroughly in the leadership literature as have the previous variables. That variable is task-relevant expertise in the group. Here, we are concerned with those variables such as experience and the like which are likely to reflect task expertise. We propose that subordinate groups with less expertise are likely to need additional discretionary leadership. Higher expertise group members may or may not benefit from additional discretionary leadership.

Stating this relation in propositional form, we then have:

Proposition 6: As group expertise increases, differences in unit outcomes between low and high discretionary leaders will decrease.

Interactive Relationships in the Multiple Influence Model of Leadership--A Summary

The theoretical arguments underlying the interactions may be summarized to show the multiple influences the leader should meet to increase unit outcomes. As complexity in the macro factors increases (be this from the environment, context, or structure), the leader should respond with greater discretion. More discretionary task activity provides additional channels to cope successfully with the problems presented by greater complexity while allowing the unit to capitalize on opportunities. More discretionary supportiveness is needed with additional complexity to provide additional rewards for the greater effort needed to cope with a more complex setting. As the setting becomes more complex, there is a larger difference between the unit outcomes of lower versus higher discretionary leadership.

At a more micro level, the leader must also adjust to group and task variables. We first postulated that group cohesiveness is an important group variable. Namely, as cohesiveness increases, more discretion will have a more dramatic impact on unit outcomes. The expected pattern is

similar to that for complexity in the macro setting, the higher the cohesiveness the more discretionary leadership makes a difference.

We next proposed that more difficult and varied tasks call for discretionary leadership to engender high performance and employee maintenance. Yet, when the task is simple and routine, increases in task aspects of leader discretion will boomerang--yielding lower employee maintenance. Supportive actions generally help improve employee maintenance under all types of tasks but will have a somewhat greater impact when the job is difficult and varied (they are needed as additional rewards). Thus, for task characteristics, we have a classical interaction where discretionary task aspects of leadership could be detrimental.

Finally, we argued that leaders heading units with less experience or expertise should intervene with more discretionary leadership. Such intervention could clarify duties and priorities and help unit members with less expertise improve their performance. Discretion will make less difference for unit members with more expertise.

Some Additional Considerations

Our discussion of interactions briefly considered some different leadership dimensions. Let's pursue this further. What are likely to be some important dimensions of leadership? Those familiar with the literature will recognize that task and socio-emotional categories have been consistently found in studies designed to identify leadership dimensions. The task-related aspects of leadership have themselves been subdivided to provide a clearer picture of what leaders can do to increase unit outcomes. Recent investigations by Schriesheim (1978) and Jermier and Berkes (1979) suggest that clarifying the job of subordinates (role clarification), assigning specific duties to group members (work assignments), and providing guidelines for action by interpreting rules and procedures (rules and procedures) are three major aspects of the task dimension of leadership. These authors have also used a support measure to tap key aspects of the socio-emotional aspect of leadership. As we show in the method section, these dimensions serve as the core for our treatment of leadership.

The previous dimensions focus on vertical aspects of leadership. In addition to these, we are concerned with conducting an exploratory analysis of the impact of lateral leadership. Lateral leadership is conceptualized in terms of the leader's general orientation toward actions with those at or near his/her organizational level. For example, to what extent is the leader willing to (a) develop specific guidelines for interunit exchanges? (b) structure relations with other unit exchanges? and (c) respond to pressures from others? It was felt that lateral relations would be particularly important for the Army telecommunications centers which served as the sample units in this investigation since their mission is to link message senders and receivers. Since lateral leadership has not been systematically investigated, we felt an exploratory analysis was more appropriate than developing specific propositions regarding association of lateral leadership with macro factors, group or task variables or criteria.

A final consideration is concerned with the emphasis of our approach on macro factors in addition to those variables more traditionally examined. We have argued, at least implicitly, that such a macro emphasis should account for a larger proportion of criterion variance. As a final step in this investigation, we propose supplementing the separate tests of each of the propositions with an overall test which combines the variables in the propositions. This is proposed as an initial step in estimating the general order of magnitude of the criterion variance which might be accounted for by a leadership model which includes macro variables. The uniqueness of the sample and its size preclude a more complete test. However, the results here should be suggestive of the potential predictive usefulness of such models.

The Multiple Influence Model of Leadership--A Summary

We have outlined the theoretical underpinnings of the proposed Multiple Influence Model of Leadership. Before restating the six key propositions investigated in this study, it is important to review the definition of key terms. Discretionary leadership is the influence the leader builds beyond that typically vested in the role. We suggested that discretionary leadership and the impact of discretionary influence on unit outcome criteria was partially dependent upon macro factors. Three macro factors were identified--the environment, context, and structure of the unit. We introduced the concepts of: (a) environmental complexity (the set of external problems and opportunities facing the unit); (b) contextual complexity (the size, technological sophistication, and technological variability of the unit); and (c) structural complexity (the extent to which the structure is vertically specialized and controlled, horizontally specialized and coordinated, and the diversity of the pattern of structure). We suggested that the model should help explain and predict unit outcome criteria. Unit outcomes were described in terms of performance and employee maintenance. The term employee maintenance was used to label those criteria involved with attracting and maintaining a viable work force. The criteria considered were job satisfaction, job involvement, intent to leave, perceived equitable treatment via system rewards, unit goal congruence, and system goal congruence.

We proposed that the impact of discretionary leadership was altered by group and task variables. Following existing views, group cohesiveness, task difficulty, and task variability were all expected to alter the association between discretionary leadership and unit outcomes. Group member experience conceptualized as an indicator of expertise was also proposed as being a potentially important variable in this category, but on a more tentative basis. The inclusion of group conditions helps link our approach to other models of leadership success.

With these brief definitions in mind, we can restate the six general propositions which were formulated to focus our research:

1. Leaders adjust their discretionary leadership to meet unique variations in the environment, context, and structure of their unit.

2. Macro variables will be significantly associated with unit outcomes.

3. Greater discretion will have a positive impact on unit outcomes.

4. Unit outcome differences between lower and higher discretionary leadership will increase as environmental, contextual, and structural complexity increase.

5. Discretionary leadership will be associated with higher unit outcomes when it complements unit conditions.

6. When group member expertise is higher, unit outcome differences between lower and higher discretionary leadership will decrease.

We pointed out that the six propositions relating to discretionary leadership were the major focus of our study. However, these were supplemented with two important exploratory analyses. The first of these was concerned with lateral leadership. Lateral leadership was conceptualized in terms of the extent to which a leader felt it appropriate to engage in a wide range of relations with those at or near his/her own level in the organization. Lateral leadership was considered to be a potentially important addition to the vertical leadership exemplified in the discretionary propositions.

The second exploratory analysis involved investigating the previously discussed variables in combination. Such an analysis would provide preliminary information concerning the potential criterion predictability of a global macro-oriented leadership model.

To close this summary, it is informative to examine Figure 2 which treats the multiple influence variables and propositions in diagrammatic form.

Method

Setting and Sample

The Multiple Influence Model is quite complex with a large number of macro and other variables to be considered in addition to leadership and criteria. Thus, a complete test of the model in any one sample is not very feasible. We therefore opted for a partial test. Sample selection centered on narrow variations in some conditions to provide a "strong influence test" (Platt, 1964) and more variation in those conditions which have received the least attention in the literature.

In order to increase the relevance of this study's findings for Army use, the decision was made to sample military units. It was also determined that, to the extent possible, such units should have "hard" performance criteria in order to supplement the less rigorous employee maintenance type of criteria. Finally, individuals within the units needed to possess a high enough literacy level so that they could complete questionnaires which were the primary data sources for our study. Conferral with the Army Research

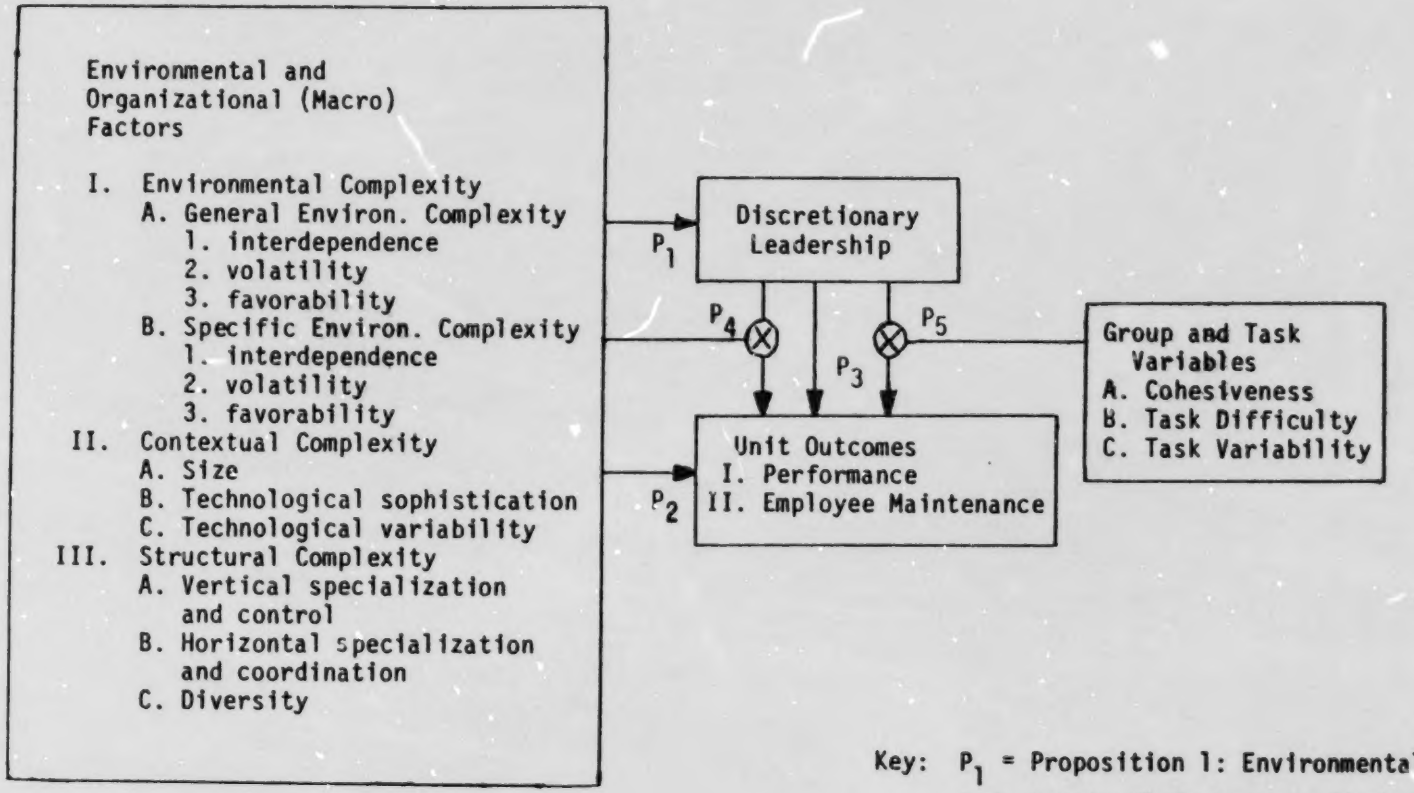


Figure 2. A diagramatic summary of key relationships in the Multiple Influence Model of Leadership.

Key: P_1 = Proposition 1: Environmental, contextual, and structural factors to discretionary leadership.
P_2 = Proposition 2: Macro factors to unit outcomes.
P_3 = Proposition 3: Discretionary leadership to unit outcomes.
P_4 = Proposition 4: Macro factors and leadership interactions to unit outcomes.
P_5 = Proposition 5: Group and Task variable interactions with leadership to unit outcomes.

Institute suggested that Army telecommunications centers (TCCs) appeared to be prime candidates for the empirical investigation. Not only did they appear to meet our requirements, but they are key contributors to the mission accomplishment of the Department of the Army. ARI helped lay the groundwork in obtaining the permission of these units to participate in the study.

The sample consisted of Army and civilian supervisory personnel within TCCs from the Seventh Signal Command. These units were distributed throughout the United States and included Panama and Puerto Rico. They had similar missions and, except for size, appeared to be similar in terms of context and structure. Hard performance data relating to the effectiveness with which message transmissions were handled are used by the Army to evaluate these units. The performance outcomes of these units are a part of a system designed by the Army to be as heavily machine-controlled as possible.

Thus, the major variation in the sample was expected to be in terms of the general environment. Here, the wide geographical distribution was expected to play a key role. Because of the similarity in mission, the specific environment was expected to vary less than the general environment. Beyond that it was difficult to predict how much variation there would be. As previously indicated, the expected lack of variation (except for size) in context and structure and the machine-controlled performance measures argue for a strong inference approach. That is, we can have more confidence in significant findings involving these variables than would be the case if there were more variation in them.

Procedure

Within the TCCs the decision was made to restrict the sample to message sending and receiving personnel only. No support personnel were included. The sample was further restricted to shift supervisors, their immediate supervisor, and the supervisor's immediate superior. These positions do not always have consistent titles and the titles differ depending on whether the positions are occupied by Army or civilian personnel. However, quite common designations are shift supervisor, NCOIC, and OIC for each of the three levels, respectively. We shall use these titles throughout the remainder of this report.[6] Mail questionnaires were used for most of the variables but were supplemented by data from other sources wherever appropriate.[7]

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[6]Shift supervisors are typically sergeants or their civilian equivalents; NCOICs are typically master sergeants or equivalents; OICs are field grade officers, often majors or lieutenant colonels or their civilian equivalents.

[7]We were fortunate in being able to run a pilot study in these units to test the adequacy of our mail questionnaire procedure as well as to provide some important instrument development data useful in refining our questionnaires. The pilot study strongly suggested that the sample should concentrate on shift supervisors and their immediate superiors.

There were a potential 110 TCCs available for data gathering. Of these, 35 units were eliminated because they were atypical from the other units in some major way or because they were so small they had no shift supervisors. Of the remainder, 49 were found to have a three-level structure (shift supervisors, NCOIC, OIC) and 26 had a two-level structure without the intermediate level of supervision.

Mail questionnaires were administered to the appropriate supervisory positions in the 75 two- and three-level TCCs. The procedure utilized was developed from the earlier pilot study with these units and is described in Appendix B. Of these, seven units either had no response or returns were not received from enough people within the unit to be included in the study. The return rate was thus 91%. The percentage of usable returns by supervisory level within the units ranged from 81% at the shift supervisor level to 91% at the OIC level. Performance data provided by the Seventh Signal Command were not made available for 13 of these units because they were considered "top secret." Thus, a total of 55 units was generally used in examining relationships concerned with performance, while 68 units generally were used for employee maintenance. (For some variables, sample size was slightly smaller due to missing data.) The unit of analysis was by group rather than individual. Therefore, questionnaire data were aggregated within unit, as appropriate, for each TCC sampled.

Measures

Data were obtained for the following variables: (a) environmental conditions (general environment and specific environment); (b) contextual variables (size, technological sophistication, technological variability); (c) structural variables (vertical specialization and control, horizontal specialization and coordination, and structural diversity); (d) vertical and lateral leadership; (e) group and task variables; and (f) unit outcome criteria (performance and various aspects of employee maintenance).

Details concerning specific aspects of these variables used in this study are described below. Means, medians, indications of skewness, standard deviations, and reliability coefficients for those specific aspects are summarized in Appendix D (Exhibit D-1). Intercorrelations are shown in the appropriate exhibits in Appendix D.

Environmental Conditions. Consistent with the work of Farmer and Richman (1964), the general environment was operationalized in terms of legal-political, socio-cultural, economic, and educational conditions within a specified geographical area. The geographical area for each unit consisted of the state within which the unit was located. The indicators summarized in the bottom portion of Exhibit D-1, of Appendix D, were standardized and summed for indexes of interdependency, volatility, and favorability across the four general conditions above. Data for these indicators were taken from census of population figures (see Osborn, 1976). The particular items chosen are justified on a priori grounds as being appropriate to tap the construct. They were intended also to be general enough for use in future studies which might be conducted in other countries which might not have census data in the same form as in this country. General environment complexity was obtained by multiplying the interdependence, volatility, and favorability scores by each other.

The specific environment was measured by asking OICs to complete the scales shown in Exhibit C-2. That instrument is based on the work of Aldrich (1971), Duncan (1971), Emery and Trist (1965), Osborn and Hunt (1974b), and Thompson (1967) among others. This exhibit shows items relating to interdependence, volatility, and favorability. Consistent with general environment complexity, the three measures were multiplied by each other to provide a measure of specific environment complexity. An overall environmental complexity measure was then calculated by multiplying the general and specific complexity measures by each other.

Contextual Variables. Unit size was measured by counting the number of direct full-time operators and supervisors in the TCC units. This information was available from rosters provided by the Seventh Signal Command. As might be expected, the measure correlated highly (r's in the 0.7 range) with other size-related measures such as number of messages sent and received. Consistent with the literature concerning size (e.g., Kimberly, 1976), a log transformation was used to adjust for skewness and for the diminishing impact on criteria typically reported as size increases.

Technological sophistication was measured by asking each shift supervisor and his/her superior to complete Exhibit C-3. It is a between-unit modification of a scale developed by Van de Ven (1975) designed to measure within-unit workflow. A lower score was interpreted as indicating less sophistication. Following Van de Ven (1975), the shift supervisors' scores were averaged and combined with their boss' score and divided by 2.0 to provide a composite index.

Technological variability was measured by a modification of a specialization scale developed by Ford (1976) (Exhibit C-3). The higher the score the less the degree of variability. Scores were combined in the same manner as those for workflow.

Structural Variables. Formalization (Exhibit C-4) and decentralization (Exhibit C-4) tapped vertical specialization and control. The formalization measure was adapted from Van de Ven (1975). The decentralization measure was adapted from Ford (1976) and Melcher (1976). Higher formalization and greater decentralization were interpreted as indicating greater vertical specialization and control. Following the logic expressed in the theory section, within-unit workflow (Van de Ven, 1975) (Exhibit C-4) was used as a measure of horizontal specialization and coordination. The higher the score, the more the horizontal specialization and coordination. Task standardization (Exhibit C-4) was used as a measure of structural diversity. The less standardization, the greater the diversity. The measure was modified from Van de Ven (1975). Shift supervisor and their immediate superior's scores for all of these were combined as for the above variables.

Consistent with the earlier complexity measures, the four measures above were multiplied by each other to provide a measure of structural complexity.

Vertical Leadership. The heart of our approach is the measure of discretionary leadership. Details on the development of that instrument as it evolved through four pilot samples, including one with the present units,

are summarized in Appendix A. Here we briefly highlight information on instruments used in the present investigation.

The dimensions used in the present study are based on the work of Schriesheim (1978) and Jermier and Berkes (1979). These, in turn, were based on modifications of the earlier LBDQ-Form XII dimensions of consideration and initiating structure (Stogdill, 1963) and consist of: (a) role clarification, (b) work assignments, (c) rules and procedures, and (d) support.

As a base against which to compare discretionary leadership, the four dimensions above were used to tap leader behavior, discretionary leadership, and required leadership (Exhibit C-5). All scales were completed by the shift supervisors to describe their superior. Based on the results for the pilot data using the present units (Appendix A, Sample 4), two different measures of discretion and one measure of required leadership were used here. The first discretionary measure was termed "categorical" and is shown in Exhibit C-5. The second was labeled "points" (Exhibit C-5). These measures were found to have acceptable convergent and discriminant validity for support and rules and procedures as shown in Exhibit D-26, in Appendix D.

The leadership requirements scale is shown in Exhibit C-5. Because the major emphasis was on discretionary leadership, the requirements scale is considered as a supplementary one and is less well-developed than the discretionary measure. For all leadership scales, a higher score reflects greater discretion, behavior, requirements, etc.

Lateral Leadership. The measure of lateral leadership used in this study is based on the work of Osborn (1971), Duffy (1973), Osborn and Hunt (1974a; 1974b), and Osborn, Hunt, and Skaret (1977). It is shown in Exhibit C-5. It was completed by the OICs who were asked how typical unit heads in their position should behave in dealings with others at or near their organizational level. A factor analysis of the 30 items revealed three dimensions with acceptable internal consistency reliabilities. These were labeled pressure for action, network development, and adaptation to pressure, respectively. Details of the factor analysis procedure are provided in Appendix D and a summary of the results is shown in Exhibit D-27.

Group and Task Variables. A key aspect of group characteristics postulated in our model is group cohesiveness. Scott's and Rowland's (1970) scale was used to measure this (Exhibit C-6). In addition to the theoretical and psychometric justifications reported by Scott and Rowland (1970), Greene and Schriesheim (1977) have argued that it captures the conceptual meaning of cohesiveness. The scale is also similar to Fiedler's group atmosphere measure (Fiedler, 1967). It was completed here by shift supervisors to describe the cohesiveness of their subordinate work group, following the approach of Fiedler (1967). A higher score reflects greater cohesiveness.

Task characteristics were measured by Van de Ven's (1975) measure of task difficulty (Exhibit C-6) and task variability (Exhibit C-5). The shift supervisors completed these scales and their scores were aggregated for their units. Higher scores reflect greater task variability and task difficulty.

The exploratory group variable of expertise was measured by standardizing and combining three variables: (a) total years of service for Army or civil service personnel; (b) age in years; and (c) whether the person was an Army or civil service employee.[8] These variables were correlated from 0.70 to 0.92 with each other and were interpreted on the assumption that longer service, older age, and civilian status led to greater familiarity or expertise.

Criteria. Performance measures consisted of: (a) machine error rate (the percentage of mistakes in message headings sent for a 1-month period); and (b) machine down time (number of hours per month a machine is inoperable). These data were provided by the Seventh Signal Command. Traditional measures of reliability are not available and consistency in performance over time is itself considered an important criterion. However, 15 units had 2 machines. Here the correlation between error rates was above .9. For down time older machines had lower performance and down time on the newest equipment was used. Machine age could not be used in analysis due to security considerations. Figures for both of these measures were averaged over the most recent 6-month period preceding the study.

Since the distribution on the first of these measures was skewed and four of the units had machines quite different from the others, a log transformation was used. This log transformation then represented the level of error rate. The higher the score, the higher the error rate. We were also interested in the variability over the 6-month period. This consisted of the standard deviation over the 6-month period. The higher the score, the higher the variability.

In a similar manner, variability of the down time was calculated. Thus, there were two measures tapping level and two tapping variability, one each for the error rate and down time.

These measures were automatically provided as a by-product of message center technology and thus were not susceptible to direct "fudging" or manipulation by the subjects. They also reflected an adjustment for unit size so that the output of different sized units was directly comparable. As previously indicated, the outputs were designed by the Army to be as strongly machine-controlled as possible so that leadership effects would be minimized. Thus, any such effects that might be shown would support a strong inference test of our model.

Measures of job satisfaction, job involvement, intent to leave, system rewards, and system and unit goal congruence were used to tap a broad range of employee maintenance measures. All of these were obtained from shift supervisor questionnaire responses. Scores were aggregated across shift supervisors within a unit to provide a unit score.

The well-known Job Descriptive Index (Smith, Kendall, & Hulin, 1969) (JDI) was used to measure satisfaction with: work, supervision, co-workers, pay, and promotion (Exhibit C-7). Some, such as Vroom (1964), have argued

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[8] Rotation of Army personnel may lead to less experience on a particular type of equipment.

that this is the most thoroughly developed of all job satisfaction measures. In addition to the individual dimensions, a total composite score was used to tap total job satisfaction. Another measure of total satisfaction used was the Kunin (1955) Job in General Measure (Exhibit C-7).

Job involvement tapped the involvement of an individual with his or her job. It was measured by the well-known Lodahl and Kejner (1965) scale (Exhibit C-7). Sekaran (1980) has shown the construct to be conceptually and empirically different from, though related to, job satisfaction. A higher score reflected greater involvement.

Intent to leave was used as a measure of the likelihood of leaving the Army or Civil Service employment. The items utilized were adapted from Patton (1970) by Martin (1977) (Exhibit C-7). Patton showed his measure to have a correlation of .84 with later turnover and Price and Bluedorn (1977) found a correlation of about .50 for a similar measure with subsequent turnover.

System rewards was a criterion measure developed by the authors especially for this study based on feedback from Army officials and the earlier pilot data for this sample. A high score on this measure reflects greater perceived equity of rewards (Exhibit C-7).

In a similar manner, system and unit goal congruence were considered to be potentially important employee maintenance variables for these as well as other Army units. They were judged to be morale-related or esprit de corps type items, following the definition set forth by Stagner (1956). The measures used are shown in Exhibit C-7.

Summary of Conceptual and Operational Linkages. For many of these variables the conceptual and operational linkages are straightforward. However, a summary of these linkages for the less straightforward macro variables may be useful at this point. It is shown in Table 1.

Data Analysis

The first three propositions examine main effects. As such, simple zero-order correlations would appear initially to be appropriate for each predictor and each criterion. Given the large number of relationships that need to be examined, however, a series of zero-order correlations would capitalize heavily on chance.

Thus, canonical correlation using Wilk's Lambda (Cooley & Lohnes, 1962) was first used to test for significance among a group of predictors and criteria. Then zero-order correlations were used to isolate the specific contributors to the overall relationship. For example, as a part of Proposition 2, to investigate the relationships of specific environment interdependence, volatility, and favorability with the employee maintenance variables, a test using Wilk's Lambda would be initially conducted. Then if it revealed a significant overall relationship, zero-order correlations would isolate where, among the variables, the relationship existed.

Table 1

Summary of Concepts and Measures Used
for Environment, Context, and Structure

Concept	Measures
General Environment	
Interdependence	Sum of 4 items from census data
Volatility	Sum of 4 items from census data
Favorability	Sum of 4 items from census data
Complexity	Interdependence X volatility X favorability
Specific Environment	
Interdependence	Sum of 4 questionnaire interdependence items from OIC
Volatility	Sum of 4 volatility items from OIC
Favorability	Sum of 4 favorability items from OIC
Complexity	Interdependence X volatility X favorability
Context	
Size	Log of data from organization roster from 7th Signal Command
Technological Sophistication	Between-unit workflow composite of sum of 4 items from shift supervisors and OIC/NCOIC
Technological Variability	Specialization composite of sum of 3 items from shift supervisors and OIC/NCOIC
Complexity	Log of size X within-unit workflow X specialization
Structure	
Vertical Specialization and Control	Formalization (sum of 9 items) X decentralization (sum of 12 items) composite from shift supervisors and OIC/NCOIC
Horizontal Specialization and Coordination	Within-unit workflow composite of sum of 4 items from shift supervisors and OIC/NCOIC
Diversity	Standardization composite of sum of 4 items from shift supervisors and OIC/NCOIC
Complexity	(Formalization X decentralization) X within-unit workflow X standardization

For these tests, all the leadership dimensions were included even though role clarity and work assignments did not meet the requirements for convergent and discriminant validity as well as did support and rules and procedures. It was felt, for exploratory purposes, that information concerning their concurrent validity would be a useful supplement to the earlier convergent and discriminant results. Similarly, results are reported for required leadership even though that was not a major concern of this study.

The last three propositions call for interactive tests. Here, to simplify the analyses, results are not reported for discretionary role clarity and work assignments. They are reported for the other two leadership measures: leader behavior and lateral leadership. Required leadership results are reported when necessary to help add insights to comparisons between discretionary leadership and leader behavior.

The interactions were tested using the moderated regression technique (Cohen, 1968; McNeil, Kelly, & McNeil, 1975). Unlike a laboratory design, in a field study one cannot usually specify experimental and control conditions. Thus, comparison of main effects under differing conditions of another variable is not always feasible. Since conditions are represented by a continuous distribution of scores and not discrete categories, analysis of interaction effects is best conducted using moderated regression analysis. It is important to note that in using this technique, interactions may be significant predictors while main effects are not significant (see Cohen & Cohen, 1975, for a more detailed discussion of moderated regression versus more traditional ANOVA approaches). Here a "full" model containing the interactive term was tested against a "restricted" model without the interactive term. An F-test of the full versus restricted model R-square was then used to determine the unique variance contributed by the interactive term. A separate model was formulated for each aspect of complexity (environmental, contextual, and structural), each of the two discretionary leadership dimensions (support and rules and procedures), and each of the performance and employee maintenance criterion measures.

For example, where Cr = the criterion of interest and E = environmental complexity, C = contextual complexity, St = structural complexity, and S = discretionary support, a test for the interaction between environmental complexity and discretionary support would compare the full model: Cr = E + C + St + S + (ExS) against the restricted model: E + C + St + S. If the F-test for the incremental variance (ΔR^2) were significant, then there would be a significant interaction. The other complexity measures were tested in the same way as were the other aspects of leadership.

The models for group cohesiveness and the task variables were similar. Again, using discretionary support (S) as an example, the full model testing cohesiveness was: Cr = G + TD + TV + S + (GxS) versus the restricted model: G + TD + TV + S, where G = group cohesiveness, TD = task difficulty, and TV = task variability. Other similar models were used to test for task difficulty interactions.

The exploratory expertise index interaction (Ex) was tested by comparing: Cr = Ex + S + (Ex x S) against Ex + S.

As a supplement to these global interactions, more specific interactions were tested using the components of the complexity measures when there was a pattern of significant findings. Figure 3 illustrates the details of this procedure.

A final analysis involved a global investigation of the previous variables in combination. This analysis depended on which variables were found to be significant for each criterion in the earlier tests. The specific models for this analysis are, therefore, treated in a later section of this report.

Results

Before reporting the results relating to the propositions, it is instructive to consider the degree of variability in each of the measures. This will provide some empirical data against which to compare our original assumptions concerning variability in the sample. As we indicated previously, we expected there to be substantial variation in the general environment. We were not so sure concerning the specific environment. We expected relatively little contextual variation except that which might be related to unit size, which was expected to vary considerably.

Likewise there was expected to be relatively little variation in terms of structure. Information obtained concerning performance indicated that it was designed to be as heavily machine-controlled as possible and thus to be relatively constant. Table 2 reports the coefficient of variability for each of the measures used. These coefficients may be compared with each other to obtain a general idea of the relative variation of each measure.

Concerning the variables which formed the basis for our sample selection, the data show:

1. Relatively large variability in general environment interdependence and volatility; considerably smaller variability in favorability.

2. Generally low (around 20) variability in specific environment interdependence and favorability but with somewhat larger variation in volatility.

3. Small to moderate variations in the contextual components.[9]

4. Variations in structure of about the same magnitude as context.

5. Small variations in the level of performance and in performance variability.

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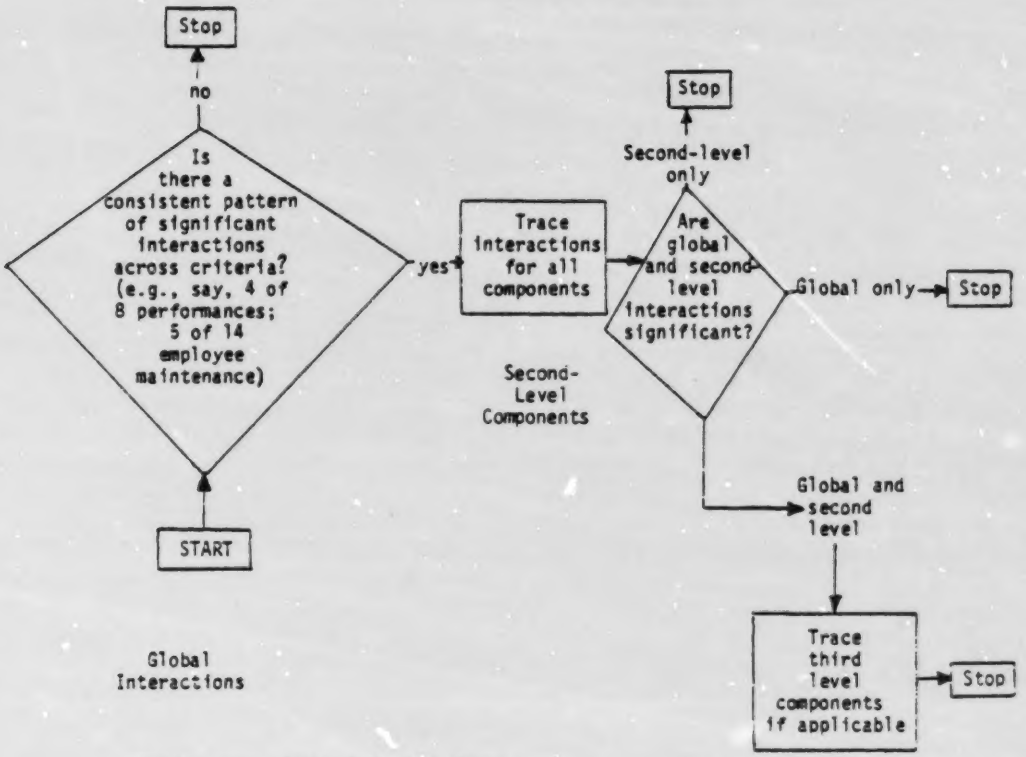
[9]Unit size was initially expected to have substantial variability. It did not because many of the smaller units were not included in the sample because of a lack of shift supervisors.



Models were of the following form:

Environment[a]

Global model	E + C + St + DL + (E x DL) versus E + C + St+ DL.
Second level	GE + SE + DL + (GE or SE x DL) versus GE + SE + DL.
Third level	I + V + F + DL + (I or V or F x DL) versus I + V + F + DL.

Where E = environmental complexity, C = contextual complexity, St = structural complexity, DL = a given discretionary leadership dimension, GE = general environment complexity, SE = specific environment complexity, I = interdependence, V = volatility, F = favorability.

Context[b]

Global model	E + C + St + DL + (C x DL) versus E + C + St + DL.
Second level	Sz + BW + DL + (Sz or BW x DL) versus S + BW + DL.

Where: Sz = size, BW = between-unit workflow.

Structure[b]

Global model	E + C + St + DL + (St x DL) versus E + C + St + DL.
Second level	Fo + De + Wu + (Fo or De or Wu x DL) versus Fo + De + Wu

Where: Fo = formalization, De = decentralization, Wu = within-unit workflow.

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[a]Environment uses global, second, and third-level tracings; context and structure use global and second-level tracings only.

[b]For second level interactions, context has a specialization component and structure has a standardization component which are not included in interactions because they were found to be virtually invariant.

Figure 3. Decision-tree diagram for tracing global complexity interactions to determine whether significance due to global model or components.

Table 2

Coefficient of Variation ($SD/\bar{X} \times 100$) for Variables in the Present Sample

Variable	Coefficient of Variation
General Environment	
Interdependence[d]	100.2
Volatility[a]	128.1
Favorability[a]	30.8
Specific Environment	
Interdependence	18.9
Volatility	37.8
Favorability	21.9
Context	
Log of Size	20.0
Between-Unit Workflow	22.0
Task Specialization	2.4
Structure	
Formalization[b]	26.9
Decentralization	23.9
Within-Unit Workflow	23.9
Standardization	2.6
Group and Task Variables	
Cohesiveness	10.2
Task Difficulty	24.2
Task Variability	26.8
Expertise Index[c]	40.4
Age[a]	22.2
Years of Service[a]	40.7
Percent of Civilian Employees[a]	58.3
Discretionary Leadership	
Role Clarity[b]	5.2
Work Assignment[b]	4.4
Rules and Procedures[b]	44.9
Support[b]	34.2

Table 2--Continued

Variable	Coefficient of Variation
Leader Behavior	
Role Clarity	15.5
Work Assignment	12.1
Rules and Procedures	13.1
Support	18.6
Required Leadership	
Role Clarity	31.9
Work Assignment	32.5
Rules and Procedures	24.7
Support	26.6
Lateral Leadership	
Pressure for Action	18.2
Network Development	23.0
Adaptation to Pressure	14.9
Performance	
Log of Error Rate[b]	3.5
Log of Down Time[b]	4.4
Log of Variability in Error Rate[b]	4.4
Log of Variability in Down Time[b]	4.6
Employee Maintenance	
JDI Work	26.7
JDI Supervision	27.7
JDI Co-Workers	20.1
JDI Pay	45.6
JDI Promotion	78.8
JDI Total Score	19.6
Job in General Satisfaction	22.5
Job Involvement	13.0
Intent to Leave	32.1
System Rewards	25.9
Unit Goal Congruence	15.6
System Goal Congruence	17.4

[a]The items for these dimensions were standardized with a mean of 0.0 and a standard deviation of 1.0 before they were added to form a dimension. Since a coefficient of variation could not be calculated for these standardized scores, the values here are based on the unstandardized item means for each of the dimensions.

[b]Since these measures included negative valves, a constant was added to the raw scores in order to make all values equal to or greater than zero prior to calculation of the coefficient.

[c]The items for this index were standardized and added to form the dimension. The values here are based on the unstandardized item means.

Thus, the original expectations concerning variability appear to be largely confirmed, with the exception of the general environment, favorability, and unit size. Thus, we seem to have variables providing for a strong inference test.

Also, while we did not estimate the variability in the other variables of interest in this study, Table 2 summarizes their values as well. It is interesting to note that the two most reliable discretionary leadership measures, support and rules and procedures, have moderate variability, while the variability in the other two is quite small. The required leadership dimensions have moderate variability, while the leader behavior dimensions have less variability as do the lateral dimensions. The group and task variables have values ranging from relatively low (cohesiveness) to relatively high (years of service and percent civilian employees).

In terms of employee maintenance criteria, the measures range from relatively low (job involvement) to high (JDI promotion) variability. These variability indexes can serve as a baseline against which to compare future studies in terms of variation in the items of interest.

We turn now to results for the propositions.

Results for the Noninteractive Propositions[10]

Proposition 1. The first proposition was concerned with the association between macro variables and leadership. More specifically: leaders will adjust their discretionary leadership to meet unique variations in the environment, context, and structure of their unit. The top row under each of the macro variable headings in Table 3 summarizes the results for discretionary leadership and the second row supplements these with leader behavior. Aspects of structure are found to be related to discretionary leadership but none of these dimensions are significantly ($p < .05$) related to leader behavior. Though group and task variables were not included in the statement of the proposition, those results are also included in the table as a supplement. They show a significant relationship between group and task variables and leader behavior but not discretionary leadership.

These results indicate partial support for Proposition 1.

Proposition 2. The second proposition was concerned with the association between macro variables and unit outcomes. Results are summarized in rows (3) and (4) of Table 3. They show the following:

1. In terms of environment, the only significant relationship was between aspects of the specific environment and performance.

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[10]As previously mentioned, canonical correlations among groups of predictors and criteria were used to minimize chance findings. Individual bivariate correlations for the variables in the study are included in Appendix D for those who are interested.

Table 3

Canonical Correlations for Environmental, Contextual, and Structural Components with Leadership and Criteria, Group and Task Variables, and Leadership with Criteria[a]

	df	Canonical R	Wilk's Lambda	p (2-tail)
General Environment				
(1) With Discretion	12	.39	.82	-
(2) With Leader Behavior	12	.32	.84	-
(3) With Performance	12	.40	.77	-
(4) With Employee Maintenance	21	.48	.63	-
Specific Environment				
(1) With Discretion	12	.29	.87	-
(2) With Leader Behavior	12	.30	.88	-
(3) With Performance	12	.55	.66	.037
(4) With Employee Maintenance	21	.39	.76	-
Context				
(1) With Discretion	12	.33	.80	-
(2) With Leader Behavior	12	.28	.89	-
(3) With Performance	12	.45	.75	-
(4) With Employee Maintenance	21	.42	.73	-
Structure				
(1) With Discretion	16	.49	.65	.028
(2) With Leader Behavior	16	.50	.64	.084
(3) With Performance	16	.44	.78	-
(4) With Employee Maintenance	(28 / 18)	(.66 / .57)	(.32 / .57)	(.001 / .049)
Group and Task Variables[b]				
(1) With Discretion	12	.48	.73	.067
(2) With Leader Behavior	12	.62	.56	.001
(3) With Performance	12	.31	.86	-
(4) With Employee Maintenance	21	.72	.35	.001

Table 3 --Continued

	df	Canonical R	Wilk's Lambda	p (2-Tail)
Discretionary Leadership				
(1) With Performance	16	.51	.58	.044
(2) With Employee Maintenance	(28 / 18)	(.66 / .52)	(.32 / .57)	(.001 / .034)
Leader Behavior				
(1) With Performance	16	.44	.68	-
(2) With Employee Maintenance	28	.65	.36	.001
Required Leadership				
(1) With Performance	16	.38	.79	-
(2) With Employee Maintenance	28	.49	.65	-
Lateral Leadership				
(1) With Performance	12	.55	.63	.039
(2) With Employee Maintenance	21	.32	.79	-

[a]Discretionary leadership, leader behavior, and required leadership include four dimensions; lateral leadership includes three dimensions; performance criteria include four dimensions; employee maintenance criteria include JDI total and six other dimensions.

[b]Includes cohesiveness, task difficulty, and task variability. Does not include expertise.

2. Context has no significant relationships with criteria.

3. Structure is significantly related to employee maintenance but not to performance. More specifically, there were two significant canonical roots for employee maintenance. For those interested concerning the specific variables involved in these roots, Exhibit D-19, Appendix D, provides suggestive data.

4. Again group and task variables are included as a supplement. Cohesiveness, task difficulty, and task variability are significantly related to employee maintenance but not to performance. (Expertise was not considered here since, for reasons stated earlier, it was analyzed as a separate variable, and single predictor results were not included in the canonicals.)

These findings indicate selective support for the second proposition.[11]

Proposition 3. The third proposition was concerned with the association between discretion and unit outcomes. More specifically: there will be a positive association between leadership discretion and unit outcomes. The latter part of Table 3 summarizes the canonical findings for this proposition.

The table shows that discretionary leadership is significantly related to both performance and employee maintenance. There are two significant roots for maintenance. The more specific bivariate correlations which can help in interpreting these roots are summarized in Exhibit D-21.

Again, as supplements to the proposition, results are also summarized for leader behavior, required leadership, and lateral leadership. These show significance with employee maintenance for leader behavior and with performance for lateral leadership.

These findings indicate support for the third proposition. They also show that discretionary leadership is the only measure which predicts both performance and employee maintenance.

Tests for the Interactive Propositions[12]

Proposition 4. The fourth proposition was concerned with the interaction between complexity and discretion. More specifically: unit outcome

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[11] Those interested in the relationships between complexity indexes and criteria may wish to examine Exhibits D-17, D-18, and D-19 in Appendix D.

[12] These were all directional hypotheses. Therefore, plots of all significant interactions were computed based on the approach suggested in Kelly, McNeil, Eichelberger, and Lyon (1969) for continuous variables. All plots, except where noted, had either noncrossing lines of the form predicted or, if the lines crossed, the divergence was greater for higher than for lower complexity. They were, therefore, interpreted as being consistent with our

differences between lower and higher discretionary leadership will be greater for higher complexity than for lower complexity. Table 4 summarizes these results for various aspects of complexity for the two leadership dimensions that possessed adequate convergent and discriminant validity and that also possessed the larger amount of variability (rules and procedures, and support). The table supplements the results for each of the complexity measures with "tracings" for more specific interactions following the decision rules previously outlined in Figure 3.[13] These tracings allow for the determination of whether an interaction for a complexity x discretion measure is primarily due to complexity itself or to one of the components which were multiplied to obtain the complexity index. This, in turn, can provide useful information in the interpretation of results and in the action implications of those results. The results of these tracings are further summarized in Table 5.

In terms of performance, Table 4 shows the most consistent pattern to be for contextual complexity. The proportion of significant results for environmental complexity and structural complexity appears to be too low to form a pattern. Thus, no tracings were done. The specific results for contextual complexity show that there are significant interactions with both discretionary rules and procedures and support for machine down time and the variability in down time. In all four cases of significance the interactions are attributable to components of contextual complexity. These are size for discretionary rules and procedures and between-unit workflow for discretionary support.

Turning now to employee maintenance, Tables 4 and 5 show a more complex set of relations. More specifically:

1. There are 8 of 14 significant interactions for environmental complexity. Environmental complexity interactions are found for all the employee maintenance criteria except job involvement and system rewards. In every case, significant overall environmental complexity interactions can be attributed to either the general or specific environment complexity measure or to a still more explicit component within one of these two segments. In two additional cases there are nonsignificant environmental complexity interactions with a significant component.

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[12] Continued
propositions. In those few cases where the interactions did not conform to these patterns that fact is indicated.

[13] Recall that the essence of these decision rules was: (a) inspect the pattern of significant interactions for the two criterion sets (performance and employee maintenance) for each of the complexity measures; (b) if there is a consistent pattern, e.g., say 4 of 8 for performance, trace the interaction for the components of each of the complexity measures; (c) do the same thing for employee maintenance; (d) if the global interactions only are significant, stop; (e) if the second-level interactions only are significant, stop; (f) if the global and second-level interactions are significant, trace the third level interactions, if applicable (as for environment).

Table 4

Complexity Interactions (ΔR^2) and Interacting Tracings of Macro Variables with Discretionary Rules and Procedures (RP) and Support (S)[a]

	R_Y^2	ΔR^2	Tracing	Performance Criteria	R_Y^2	ΔR^2	Tracing[a]
				Log[b] Error Rate			
ExRP[c]	.09	.03			ExS	.06	.00	
CxRP	.06	.00			CxS	.07	.01	
StxRP	.08	.01			StxS	.06	.00	
				Log Down Time			
ExRP	.09	.01			ExS	.14	.07*	
CxRP	.16	.08**	•CxRP (.08) / SzxRP (.09)		CxS	.08	.01	•CxS (.01) / BWxS (.05)
StxPR	.08	.00			StxS	.12	.05*	
				Log Variability Error Rate			
ExRP	.17	.02			ExS	.08	.00	
CxRP	.15	.00			CxS	.09	.01	
StxRP	.16	.02			StxS	.08	.00	
				Log Variability Down Time			
ExRP	.03	.01			ExS	.16	.08**	
CxRP	.07	.05*	•CxRP (.05) / SzxRP (.15)		CxS	.13	.05*	•CxS (.03) / BWxS (.11)
StxRP	.02	.00			StxS	.17	.09*	
				Employee Maintenance Criteria JDI Total			
ExRP	.38	.11**	•ExRP (.11) / GExRP (.14) / IxRP (.08), VxRP (.08)		ExS	.37	.10**	•ExS (.10) / GExS (.09) / IxS (.08)
CsRP	.27	.00			CxS	.28	.01	
StxRP	.33	.06*			StxS	.34	.06*	•StxS (.06) / WWxS (.05)
				Job in General Satisfaction			
ExRP	.16	.01	•ExRP (.01) / SExRP (.09)		ExS	.18	.04*	•ExS (.04) / GExS (.06) / IxS (.07)
CxRP	.15	.00			CxS	.14	.00	
StxRP	.23	.08**	•StxRP (.08) / DexRP (.06)		StxS	.24	.10**	•StxS (.10) / WWxS (.09)

Table 4--continued

Job Involvement

ExRP	.02	.00	ExS	.04	.01	
CxRP	.03	.00	CxS	.03	.00	
StxRP	.03	.01	StxS	.03	.00	• StxS (.00) / WWxS (.06)

Intent to Leave

ExRP	.20	.06*	• ExRP (.06) / GExRP—VxRP (.09) (.08); SExRP—VxRP (.05) (.08)	ExS	.23	.02
CxRP	.18	.05*		CxS	.23	.01
StxRP	.14	.00	• StxRP (.00) / WWxRP (.05)	StxS	.30	.09** • StxS (.09) / FoxS (.07); WWxS (.06)

System Rewards

ExRP	.11	.02	ExS	.08	.00	
CxRP	.10	.01	CxS	.09	.02	
StxRP	.10	.01	• StxRP (.01) / DexRP (.14)	StxS	.10	.03 • StxS (.03) / DexS (.10)

Unit Goal Congruence

ExRP	.28	.05*	• ExRP (.05) / GExRP (.06); SExRP (.03)	ExS	.37	.00
CxRP	.27	.03		CxS	.39	.01
StxRP	.26	.03	• StxRP (.03) / DexRP (.19)	StxS	.39	.02

System Goal Congruence

ExRP	.25	.09**	• ExRP (.09) / GExRP (.04)	ExS	.25	.03 • ExS (.03) / SExS (.04)
CxRP	.19	.03		CxS	.22	.CO
StxRP	.17	.01		SExS	.23	.01

Note: E = environmental complexity, GE = general environment complexity; SE = specific environment complexity; I = interdependence; V = volatility; C = contextual complexity, Sz = size, BW = between-unit workflow; St = structural complexity, WW = within-unit workflow; De = decentralization, Fo = formalization

*p ≤ .05 (1-tail)
**p ≤ .01 (1-tail)

[a]These tracings are consistent with the decision tree shown earlier in Figure 3. Results are reported where when RP and S are considered together: (1) there is a consistent pattern of significant global interaction across a performance or employee maintenance criterion set, e.g., at least 4 of 8 or 5 of 14; and (2) where the components identified in the tracing are significant at at least the .05 level (one-tail).

[b]n size for performance = 51; for employee maintenance varies from 6 to 68.

[c]Interactions and tracings compare a series of global and more specific interactive models of the form indicated in Figure 3.

Table 5

Summary of Significant Complexity Subdimension Interactions Identified from Tracings in Table 4

Criteria	Environmental Complexity		Contextual Complexity		Structural Complexity	
	Rules and Procedures	Support	Rules and Procedures	Support	Rules and Procedures	Support
Performance						
Log Error Rate	--	--	--	--	--	--
Log Down Time	--	--	Size	Between-Unit Workflow	--	--
Log Variability Error Rate	--	--	--	--	--	--
Log Variability Down Time	--	--	Size	Between-Unit Workflow	--	--
Employee Maintenance						
JDI Total	General Environ. Interdepen. & Volatility	General Environ. Interdepen.	--	--	--	Within-Unit Workflow
Job in General Satisfaction	Specific Environment Complexity	General Environ. Interdepen.	--	--	Decentralization	Within-Unit Workflow
Job Involvement	--	--	--	--	--	Within-Unit Workflow
Intent to Leave	General Environ. Specific Environ. Volatility	--	--	--	Within-Unit Workflow	Formalization Within-Unit Workflow
System Rewards	--	--	--	--	Decentralization	Decentralization
Unit Goal Congruence	General Environ. Complexity Specific Environ. Complexity	--	--	--	Decentralization	--
System Goal Congruence	General Environ. Complexity	Specific Environ. Complexity	--	--	--	--

2. There are not enough significant interactions for contextual complexity to form a pattern.

3. There are 5 of 14 significant interactions for structural complexity. These are found for the two satisfaction measures of JDI total and job in general and for intent to leave. In all but one of these cases the results can be traced to one or more specific components. Also, there are a number of additional cases where components contribute significant interactions but the global complexity measure does not.

Again, as a supplement to the discretionary results covered in the proposition, leader behavior and lateral leadership were investigated. A comparison of the leader behavior findings with those of discretion is shown in Table 6.

While the table shows five instances where there is a significant interaction for leader behavior and not for discretion, there are more than twice as many instances (14) where the opposite is the case. To further examine the five instances of leader behavior superiority, required leadership interactions were tested. It was reasoned that the significant leader behavior results might be partially attributable to leadership requirements. However, there was a significant required leadership interaction in only one of the five instances ($R_f^2 = .14$, $\Delta R^2 = .06$, for variability in error rate).

Based on these results, discretionary leadership appears to be the superior predictor.

The supplementary findings concerning lateral leadership are summarized in Table 7. They show:

1. With regard to performance the most consistent pattern of interactions is with environmental complexity followed by structural complexity.

2. There is a consistent pattern of significance for system rewards, unit goal congruence, and system goal congruence. The other employee maintenance criteria are shown in the table as not consistently related to lateral interactions.

3. Unlike the results for discretion, the interactions with context are generally the key ones for lateral leadership and employee maintenance.

The results for discretion as well as the supplementary findings suggest substantial support for Proposition 4.

Proposition 5. We turn now to the fifth proposition which stated that discretionary leadership will yield higher unit outcomes when it complements group and task variables. Here a divergent interaction was expected for group cohesiveness while a classical, symmetrical interaction was predicted for task difficulty and task variability. Table 8 summarizes the

Table 6

Comparison of Significant Macro Interactions for Discretionary Leadership and Leader Behavior[a]

Criteria	Environmental Complexity				Contextual Complexity				Structural Complexity			
	Discretion		Leader Behavior		Discretion		Leader Behavior		Discretion		Leader Behavior	
	Rules & Proced.	Supp.	Rules & Proced.	Supp.	Rules & Proced.	Supp.	Rules & Proced.	Supp.	Rules & Proced.	Supp.	Rules & Proced.	Supp.
Performance												
Log Error Rate	--	--	--	[x]	--	--	--	--	--	--	--	--
Log Down Time	--	x	--	x	(x)	--	--	x	--	x	--	--
Log Variability Error Rate	--	--	--	[x]	--	--	--	--	--	--	--	--
Log Variability Down Time	--	(x)	--	--	x	x	x	x	--	x	--	x
Employee Maintenance												
JDI Total	(x)	(x)	--	--	--	--	--	--	(x)	(x)	--	--
Job in General Satisfaction	--	(x)	--	--	--	--	--	--	(x)	(x)	--	--
Job Involvement	--	--	--	--	--	--	--	--	--	--	--	--
Intent to Leave	(x)	--	--	--	(x)	--	--	--	--	(x)	[x]	--
System Rewards	--	--	--	--	--	--	--	--	--	--	--	--
Unit Goal Congruence	(x)	--	--	[x]	(x)	--	--	--	--	--	--	--
System Goal Congruence	x	--	x	[x]	--	--	--	--	--	--	--	--

Note: (x)= significant at .05 level or better (one-tail); (--)= nonsignificant.

Circled letters indicate discretion significant, leader behavior not. Letters in squares indicate leader behavior significant, discretion not. No circle or square indicates both significant.

[a]For performance n = 51; for employee maintenance n = 61 to 68.

Table 7

Significant Macro Interactions (ΔR^2) for Lateral Leadership

Criteria[a]	Environmental Complexity(E) Lateral Dimension						Contextual Complexity(C) Lateral Dimension						Structural Complexity(S) Lateral Dimension					
	Pressure for Action		Network Dev.		Adapted to Press		Pressure for Action		Network Dev.		Adapted to Press		Pressure for Action		Network Dev.		Adapted to Press	
	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2
Performance[b]																		
Log Error Rate	.18	.14**	.28	.20**	.23	.00	.07	.03	.09	.02	.23	.01	.11	.07*	.10	.03	.29	.07*
Log Down Time	.07	.02	.05	.00	.05	.01	.05	.00	.05	.00	.05	.01	.06	.02	.05	.00	.10	.05*
Log Variability Error Rate	.15	.08*	.29	.19**	.28	.00	.10	.02	.10	.00	.31	.04	.11	.04	.12	.02	.30	.03
Log Variability Down Time	.07	.04	.07	.00	.06	.01	.07	.05*	.07	.00	.05	.00	.07	.04	.08	.01	.07	.02
Employee Maintenance[c]																		
Job Total	.23	.01	.22	.01	.27	.04*	.25	.03	.21	.00	.24	.01	.22	.01	.21	.00	.23	.01
System Rewards	.11	.04	.08	.00	.14	.06*	.36	.29**	.09	.01	.22	.15**	.17	.11**	.07	.01	.07	.01
Unit Goal Congruence	.27	.05*	.24	.01	.30	.07*	.53	.30**	.37	.14**	.36	.14**	.22	.00	.25	.02	.26	.02
System Goal Congruence	.28	.12**	.17	.01	.40	.23**	.49	.33**	.32	.16**	.52	.35**	.29	.13**	.16	.00	.19	.01

Note: Interactions compare: Cr = E + C + S + appropriate lateral dimension + (appropriate complexity dimension x appropriate lateral dimension) against E + C + S + appropriate lateral dimension.

[a] To simplify the table, only those criteria are listed with interactions significant at the .05 level or better (one-tail).

[b] For performance, n = 50.

[c] For employee maintenance, n = 61 to 68.

Table 8

Interactions (ΔR^2) of Cohesiveness (C), Task Difficulty (TD), and Task Variability (TV) Components of Group and Task Variables with Discretionary Rules and Procedures (RP) and Support (S)

Criteria	C x RP		C x S		TD x RP		TD x S		TV x RP		TV x S	
	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2	R_f^2	ΔR^2
Performance[a]												
Log Error Rate	.13	.12**	.01	.00	.04	.02	.03	.02	.11	.10*	.05	.05
Log Down Time	.13	.03	.11	.04	.11	.00	.08	.00	.11	.00	.08	.00
Log Variability Error Rate	.18	.08*	.03	.01	.13	.03	.13	.11**	.13	.03	.14	.12**
Log Variability Down Time	.09	.00	.21	.04	.09	.00	.17	.00	.09	.00	.16	.00
Employee Maintenance[b]												
JDI Total	.46	.00	.47	.01	.47	.01	.50	.04*	.46	.00	.46	.00
Job in General Satisfaction	.26	.00	.25	.00	.26	.00	.28	.03	.27	.02	.26	.01
Job Involvement	.09	.09*	.05	.05*	.01	.01	.00	.00	.05	.05*	.00	.00
Intent to Leave	.33	.09**	.29	.00	.24	.00	.29	.00	.25	.01	.30	.01
System Rewards	.08	.01	.07	.00	.08	.01	.08	.01	.08	.00	.07	.00
Unit Goal Congruence	.27	.00	.39	.00	.27	.01	.39	.00	.27	.00	.39	.01
System Goal Congruence	.09	.00	.15	.03	.09	.00	.13	.01	.09	.01	.12	.00

Note: Interactions compare a series of models of the form: Cr = C + TD + TV + RP or S + (C or TD or TV x RP or S) against Cr = C + TD + TV + RP or S.

*$p \leq .05$ (one-tail)

**$p \leq .01$ (one-tail).

[a]For performance, n = 55.

[b]For employee maintenance, n = 64 to 68.

results. While the table shows some significant results, plots showed none of these to be in the direction originally expected.

On balance, there is no support for the fifth proposition.

Proposition 6. The sixth and last proposition stated that unit outcome differences between lower and higher discretionary leadership will decrease when group member expertise is higher than when it is lower. This proposition examined a supplementary analysis designed to complement that for the group and task variables considered in Proposition 5. The results are summarized in Table 9. They show only 2 of 22 interactions to be significant.

Based on these findings, Proposition 6 receives virtually no support.

Investigation of Global Macro Leadership Model

Earlier we indicated that in addition to tests of the propositions we were interested in exploratory investigations of lateral leadership and a global model combining the previously considered variables. The lateral results were reported above. Those for the global model are incorporated here. They will help provide a preliminary idea of how much criterion variance might be accounted for from a macro-oriented global model of leadership.

We began by formulating specific regression models for each criterion where there was a pattern of significant findings. These global models were built for all performance measures and the following employee maintenance variables: JDI total, job in general, intent to leave, system rewards, unit goal congruence, and system goal congruence. Job involvement was not included because of the general nonsignificance reported earlier.

To minimize the chances of including too many predictors the following decision rules were applied in formulating the regression models:

1. Only significant findings where the incremental R-square was 5% or greater were considered.

2. The main effects of the complexity variables were included in each equation for employee maintenance criteria, but only where significant for performance, since the sample size was smaller for the latter.

3. Only if a dimension of leadership was itself a significant predictor or a component of a significant interaction term was it included.

4. No more than four interactions were considered in any final model.

To isolate the relative importance of interaction effects, all main effects were first incorporated into the model and then interactions were added on the basis of the incremental addition to explained variance.

Table 9

Interactions (ΔR^2) of Expertise (EX) Component of Group and Task Variables with Discretionary Rules and Procedures (RP) and Support (S)[a]

Criteria	Expertise x Rules & Procedures		Expertise x Support	
	R^2_f	ΔR^2	R^2_f	ΔR^2
Performance				
Log Error Rate	.04	.01	.03	.01
Log Down Time	.12	.03	.08	.02
Log Variability Error Rate	.19	.09*	.02	.00
Log Variability Down Time	.09	.00	.13	.01
Employee Maintenance				
JDI Total	.16	.00	.19	.00
Job in General Satisfaction	.03	.00	.04	.00
Job Involvement	.01	.00	.02	.01
Intent to Leave	.32	.01	.34	.00
System Rewards	.05	.02	.01	.00
Unit Goal Congruence	.09	.02	.24	.00
Unit Goal Congruence	.01	.01	.12	.06*

Note: Interactions compare: Cr = EX + RP or S + (EX x RP or S) against Cr = EX + RP or S.

*$p \leq .05$ (one-tail).

[a]For performance n = 51; for employee maintenance n = 64 to 68.

Table 10 shows the results for this global analysis. Results are specific to this sample and may not replicate. The R-squares for performance range from .23 to .49. Adjusted for shrinkage the range was from .07 to .39 with the largest R-square for the primary criterion (error rate) used by command to evaluate the units.

For employee maintenance the R-squares are larger, ranging from .31 to .88 (adjusted for shrinkage the range is .22 to .85). Further, there is about an equal balance between main effects and interaction effects. Also, only a maximum of three interaction effects were incorporated in these models since an additional interaction did not contribute unique variance.

Summary, Discussion, and Implications

Here we briefly summarize and discuss the results, consider some possible research extensions, and conclude with some Army-oriented applications suggested by the findings.

Key Design Characteristics of the Study

Before discussing the propositions, it is important to reiterate the basis of the study. Two features distinguish this empirical investigation from most others concerning leadership effectiveness. First, careful attention has been given to the measurement of all variables. Second, the design of the study is based on a mix of a traditional hypothesis testing approach and strong inference.

Appendix A details the efforts made to develop a psychometrically adequate measure of discretionary leadership. Four dimensions of discretionary leadership were proposed as being potentially important. Two of these, rules and procedures and support, achieved adequate reliability/validity in two samples. Measures for other variables were based on well developed instrument and/or utilized documentary sources. Specifically, measures of the general environment were based on census data, while those for the specific environment used a questionnaire developed by the senior authors. Due to questionnaire length, the short form of the task environment conditions questionnaire was utilized and the resulting internal reliabilities were acceptable, though not as high as with earlier, longer forms.

Measures for the context of the units were based on size data provided by the Seventh Signal Command and were found to crossvalidate with measures of volume of messages sent and volume received. The measure tapping technological variability had adequate internal consistency reliability.

Structural measures used the perceptions of both shift supervisors and their immediate superiors to reduce same-source bias in analyses of employee maintenance. Again, adequate reliability was achieved.

Performance measures were based on reported machine error rates and the percent of time equipment was inoperable. An average over 6 months

Table 10

Regression Analyses of Global Models
for Performance and Employee Maintenance

Criteria	Full Model	R^2_f	$R^2_{Main\ effects}$	$R^2_{Inter-actions}$
Performance				
Log Error Rate	$E+S_t+PA+Net+AP+(NetxE)+(PAxE)+(APxS_t)$	.49 (.39)	.25	.24
Log Down Time	$E+C+RP+S+PA+AP+(SxE)+(RPxC)$	.23 (.07)	.11	.12
Log Variability in Error Rate	$E+C+RP+PA+Net+AP+(NetxE)+(APxC)+(PAxE)$	.47 (.36)	.30	.17
Log Variability in Down Time	$E+C+S_t+RP+S+PA+(SxS_t)+(SxE)+(PAxC)+(RPxC)$	.32 (11)	.09	.23
Employee Maintenance				
JDI Total	$E+C+S_t+S+RP+(RPxE)+(RPxS)+(SxS_t)+(SxE)$	.47 (.37)	.31	.16
Job in General	$E+C+S_t+S+RP+(SxS_t)+(RPxS_t)$	.31 (.22)	.15	.16
Intent to Leave	$E+C+S_t+S+RP+(SxS_t)+(RPxC)+(RPxE)$	.35 (.25)	.21	.14
System Rewards	$E+C+S_t+PA+Net+AP+(PAxC)+APxC)+(NetxC)$	.47 (.37)	.08	.39
Unit Goal Congruence	$E+C+S_t+S+PA+Net+AP+(PAxC)+(NetxC)$	.83 (.80)	.38	.45
System Goal Congruence	$E+C+S_t+S+PA+Net+AP+(PAxC)+(APxC)+(NetxC)$	.88 (.85)	.23	.65

Note: Sample size for performance = 50; for employee maintenance it varies from 61 to 68. Coefficients in ( ) are corrected for shrinkage.
E = environmental complexity; C = contextual complexity; S_t = structural complexity; RP = discretionary rules and procedures; S = discretionary support; PA = lateral pressure for action; Net = lateral network development; AP = lateral adaptation to pressure.

was taken to minimize unusual circumstances. Consistency in performance was also considered to provide additional information. These consistency figures, however, are not subject to standard internal consistency analysis since they are themselves a measure of variability.

Finally, employee maintenance criteria used a variety of measures and the pattern of intercorrelation among these suggests a minimum of same-source problems (intercorrelations varied considerably).

In sum, key variables in the model were measured with the best available instruments, and each was found to possess adequate internal consistency. Those familiar with field research realize the importance of this statement. In many macro investigations, where instrument development has not benefited from the years of effort devoted to psychological constructs, questionable measurement is often found for several variables.

The design underlying the analysis is also important. Not all field tests of a theory are equal, even if adequate measurement is achieved. Where there is considerable variability in constructs and criteria, it is comparatively easy to detect significant associations. Such is the case here with general environment conditions and the two performance variability indexes.

A quite different condition is where predictors and criteria vary moderately or very little. If significant associations are found under these conditions, there is an analog to a weak manipulation in a laboratory study. This is the case for the specific environment, context, structure, discretionary leadership, and maintenance criteria in addition to the performance criteria. For these constructs we have the conditions of strong inference. Statistically significant results should replicate in other samples where constructs vary to a greater degree. Put another way, the design works against successful tests of the model. Thus, we argue, significant findings should be given considerable weight.

Findings Concerning Propositions

Now let us review the propositions. Proposition 1 argued that macro variables would predict discretionary leadership. Only mixed results were found with structural variations being associated with discretionary leadership. In this particular instance, as vertical and horizontal aspects of the structure became more complex, there was more discretion. The theory had suggested that variations in the general environment would be important. They were not, even though there was a substantial range in general environment conditions. The structural and group and task factors more closely associated with the specific linkage of subordinates to the organization were important.

Proposition 2 suggested a direct linkage between macro factors and unit outcomes. As expected, there were significant relationships for specific environment conditions and performance. Structural factors had a more pronounced association with employee maintenance criteria. The theory suggested a direct association between a general environment condition and

employee maintenance; however, such was not the case. It should be noted that the associations between structure and employee maintenance were somewhat unusual. The literature generally suggests that a more complex structure may alienate individuals and pull them away from the organization (e.g., Osborn et al., 1980). In these military units, with the need and pressure for consistent high performance, the opposite was the case. More intricate vertical and horizontal arrangements were seen in a favorable light and were associated with increased attachment to the job and the unit.

Proposition 3 began an examination of the more innovative aspects of the model. It proposed that discretionary leadership would be directly related to criteria. The key is not in the significant discretionary-criterion relations. It is in the comparison of more traditional measures of leadership and discretionary leadership. Discretionary leadership predicted performance, the more traditional leader behavior did not. When predicting maintenance, there was one global relationship with the gross measure of leadership. For discretionary leadership there were two significant canonical roots. One was traceable to rules and procedures, while a second root was traceable to support. Where both predict, discretionary leadership provides a clearer, more detailed picture. In sum, the model clearly passed its first difficult test.

Proposition 4 argued that there would be a divergent interaction between macro conditions and discretionary leadership when predicting unit outcomes (i.e., discretionary leadership would make the biggest difference when environmental, contextual, and structural complexity were highest). Here, two aspects of the model are being tested simultaneously. First, can macro conditions be adequately summarized into environmental complexity, contextual complexity, and structural complexity? Second, does discretionary leadership interact with macro conditions to predict criteria? The data suggest a positive answer to both questions.

Tests for some of the interactions involved strong inference not only by design but also by the use of multiple regression analysis (less stringent methods, which partially confound main and interaction effects, partial or split the data and compare bivariate correlations). As contextual complexity increased, more discretionary leadership (both rules and procedures and support) was needed to induce higher performance (less down time). Both were also needed to complement higher structural complexity for higher employee maintenance. For these significant relationships, using gross estimates of leader behavior did not yield a significant interaction.

Concerning environmental complexity and variability in performance, here discretionary support was found to counteract higher environmental complexity. But such was also the case when considering more gross estimates of leadership. In fact, the gross estimates of leader behavior support in interaction with environmental complexity predicted aspects of performance not found when analyzing the discretionary support-environmental complexity interaction. In these few instances, the model is only half correct. Leadership is needed to cope with the more complex environment, but it apparently does not have to be discretionary leadership.

When turning to environmental complexity and employee maintenance, again we find that greater discretionary leadership is needed for higher employee maintenance. In particular, more discretionary rules and procedures are needed to reduce intent to leave, increase agreement with unit goals, and engender more agreement with system goals. Gross estimates of rules and procedures did not yield the same significant findings. Discretionary leadership was needed.

On balance, we see the following pattern across the interactions. First, as contextual complexity increases, more discretionary leadership is needed to increase performance. Second, greater structural complexity calls for more discretionary leadership if high satisfaction and involvement are desired. Finally, greater environmental complexity calls for more discretion for higher job satisfaction and goal agreement.

Propositions 5 and 6 were concerned with more micro factors in combination with discretionary leadership. The fifth proposition posited that group and task characteristics would alter the impact of discretionary leadership. Such was the case when predicting performance with regard to group cohesiveness and discretionary rules and procedures. However, the interaction was not in the predicted direction. We speculate that further analyses of cohesiveness should follow the group literature more closely than Fiedler's model of leadership (where a leader's estimate of high group atmosphere is considered favorable). That is, we think the basis for cohesiveness should be incorporated in the model. In some cases the basis would be positive and in others, negative.

Proposition 6 was an exploration of the potential moderating role of subordinate group member expertise. No significant pattern of findings was identified and no speculations are offered.

Across all six propositions, there is a general pattern. Environment, contextual, and structural conditions are important in analyzing leadership effectiveness. In a sample where strong inference could be utilized, results exceeded expectations concerning contextual and structural complexity. Under a more traditional hypothesis testing approach, environmental complexity analyses provided mixed results. Discretionary leadership in interactive combination with environmental, contextual, and structural complexity provided the most substantial results.

Additional Findings. Before turning to the final portions of this report, it is important to highlight some additional analyses. The first deals with lateral leadership; the second with explained variance for a series of combined leadership models; and the third deals with the "tracing" for the complexity interactions.

Lateral leadership of the OICs in the telecommunications units was examined on an exploratory basis. Two patterns may be seen in the results. First, a greater willingness on the part of the OIC to engage in lateral relations was associated with several aspects of performance. Second, there were several significant interaction effects with macro factors. More willingness to pressure others for action was needed for higher performance as the environment of the unit became more complex. Much the same

pattern was found when predicting system rewards (equity) and goal agreement aspects of employee maintenance. As the context became more complex, it was important for the OIC to develop more extensive contacts with other unit heads at or near his/her own level. Finally, as environment and context became more complex, leaders more willing to adapt to others headed units where subordinates saw more equitable rewards and were more likely to agree with the goals established for the unit and system. More willingness to adapt was also needed as structural complexity increased, if high performance was desired.

Overall, the results for lateral leadership are quite promising. They suggest that as complexity increases the lateral interface (pressuring for action by others, developing channels of communication, and responding to the needs of other units) becomes more important for goal congruence, equity, and performance. It should be noted that these actions are often considered "organizational politics." Regardless of the title and the typical negative fix on these types of relationships, they can be important.

Variance of Global Model

The Multiple Influence Model was developed with two complementary purposes in mind. One was to explain more fully leadership effectiveness on a theoretical basis. The propositions centered on key theoretical aspects of the model. A second purpose was to develop an approach which could be used by practitioners to improve unit success. For both of these purposes, it is important to examine the proportion of variance explained by the model. Explaining small proportions of variance may be adequate to test theoretical relationships, but to point toward applications, a model should also explain substantial variability in success criteria.

In examining the magnitude of the relationships, it is important to state three important restrictions. First, the overall magnitude of the relationships is sample specific. It may be higher or lower in different samples. Here the magnitude is probably on the conservative side since much of the design was based on strong inference. Only small variations in most conditions are present. Second, the overall proportion of explained criterion variance is, of course, limited by the reliability of the measures. Third, base line data for overall comparison with other approaches is not readily available. Our best judgment from reading the literature suggests, however, that for the types of criteria examined in this study, proportions of explained criterion variance are often below 25% ($R = .50$) even where both predictors and criteria vary considerably.

Considering the most important findings, a global model was formulated for each criterion where there was a pattern of significant results. Macro setting variables, and discretionary and lateral leadership were considered. Across the employee maintenance criteria, the total R-squares ranged from .31 to .88. When these R-square values are corrected for shrinkage, they ranged from .22 to .85. The lowest proportion of explained variance was for the single item Job in General Satisfaction scale. For the more popular and comprehensive Job Descriptive Index measure of total satisfaction, the R-square was .47 (.37 adjusted). The proportion of explained variance

was very high for the two morale related estimates of employee maintenance--unit goal congruence and system goal congruence. In sum, using only the complexity indexes and leadership, the approach allows the researcher to predict substantial proportions of employee maintenance variance. It is also important to note that much of the explained variance can be attributed to interactions between leadership and the indexes of complexity. For these, method variance is likely to be less of a contributor than for the simpler additive models. Also, many of the predictors included non-same-source data. Finally, it should be noted that the overall design of the study worked against explaining large proportions of variance.

Turning to performance, the R-squares are more modest but still quite substantial. They range from a low of .23 to a high of .49. The adjusted R-squares range from .07 to .39. Using the most conservative figures, over a third of the variability in the primary criterion, error rate, can be accounted for by macro variables and leadership. (Recall the total variability in this criterion is quite small.) There was also a rough balance between main and interaction effects. Much the same was found for consistency in the error rate. Thus, even where criteria are judged to be primarily outside the direct influence of the OIC and machine-controlled, the approach predicts substantial proportions of variance.

Interaction Tracings

Finally, where there was a pattern of significant interactions, an attempt was made to trace the specific macro factors most likely to be accounting for the findings. As shown in the results, many of the more general interactions between discretionary leadership and environmental, contextual, or structural complexity could be traced to one or two key aspects. For instance, as the size of the unit increased, it was particularly important for the leader to increase his/her discretionary rules and procedures to improve aspects of performance. Detailed analyses of these tracing patterns for significant findings could be used to isolate important factors for leaders for particular units in a given command.

As a whole, the exploratory analyses suggest that: (a) lateral leadership is a potentially important aspect of leadership; (b) the magnitude of the variance explained appears sufficient to deserve the attention of both practitioners and scholars; and (c) it is possible to trace many global interactions between discretionary leadership and aspects of complexity in the setting to more specific setting variables.

Obviously these exploratory analyses call for additional research. For instance, lateral leadership was important in this sample of OICs, but has not always been important for leaders lower in the organization (Duffy, 1973). But instead of listing a whole series of unanswered questions, it may be more instructive to consider some of the research design implications emanating from this successful examination of the Multiple Influence Model of Leadership. Let us turn to these issues and then delve into applications.

Extensions

The incorporation of macro variables in analyzing leadership effectiveness appears quite fruitful from two standpoints. First, it facilitates a different organizational and applications perspective which may help administrators improve the effectiveness of important subsystems. Second, it helps clarify theoretical relationships which have received very little empirical attention in the literature. In this section we will expand upon some of the directions toward which future research might be targeted to continue to expand our understanding of leadership effectiveness.

One of the more direct implications for future research comes in research design. The typical leadership study concentrates on first-level supervisors and attempts to predict the performance of their groups and/or the performance and satisfaction of individual subordinates. While appropriate for analysis of some micro factors, such a restricted design precludes investigation of the potentially important macro setting variables. With the measures provided here, it is possible to allow environmental, contextual, and structural conditions to vary and still measure them with some degree of precision. Studies can be conducted with collections of higher level administrators who face different structures, contexts, and/or environments. This emphasis on macro variables and higher level leaders can be matched with an emphasis on discretionary leadership.

Logical extensions of the present study could concentrate on different combinations of macro variables. In the present examination, specific environment conditions were not highly varied and all units operated with very similar contexts and structures. It would be possible to select sample units with more varied task environments and structures and similar contexts to begin to analyze the possible combined influences of environmental and structural complexity on leadership effectiveness. It is possible that the structure of a unit can be reconfigured to capitalize on environmental opportunities and still minimize problems of specific environment interdependence and volatility. The underlying theory would suggest that as the structure is less capable of meeting environmental demands, more discretionary leadership is needed to maintain unit effectiveness.

Another possibility is the examination of leadership where there are wide variations in both environmental conditions and structure in a series of units with a common context. This could begin to lead to a clearer understanding of the associations among organizational design, discretionary leadership, and the average success of units. Is it possible to redesign the structure of units to offset pressures for discretionary leadership emanating from the environment? Similarly, a sample of units could be selected so that environmental complexity and contextual complexity varied considerably while structure did not. Here the question would be: Can modifications in context be used to offset environmentally induced needs for discretionary leadership?

These suggestions only scratch the surface. However, one major point seems clear. This study has opened the door to a whole new series of questions regarding the interrelationships among macro variables and leadership. More empirical work is needed either under the theoretical umbrella of the

Multiple Influence approach or under some rival perspective. Measures, such as those developed here, and the combination of macro factors into environmental, contextual, and structural complexity make macro studies feasible and potentially fruitful.

While our predisposition is toward field investigation, it should also be recognized that analysis of macro variables and leadership might proceed via simulation. In a simulated organization, the dynamics among leaders facing different environmental, contextual, and structural complexity could be systematically investigated in detail. Common environmental, contextual, and structural conditions could be presented to analyze how different types of individuals do or do not respond accordingly. Such simulations would allow researchers to study in greater detail how some leaders develop discretion with different types of subordinates. The appropriateness of different structures under differing contexts and environments could be examined in conjunction with the discretionary leadership needed to secure high unit effectiveness. The "Looking Glass" simulation would appear to be one potential vehicle for this. (For a description, see McCall and Lombardo, 1978.)

With a long history of leadership findings, it is not surprising that the addition of discretionary leadership did not by itself add huge increases in predicted variance. In competition with more traditional measures of leader behavior, it was superior but not by an outstanding margin. Certainly more attention needs to be given to the measurement of discretionary leadership in general. In particular, reliable and valid measures for additional dimensions are needed. Application of a macro-based approach would be enhanced if supervisors and higher level administrators were able to clearly identify those with high discretionary leadership.

In attempting to predict discretionary leadership, it is clear that macro variables are not the only important factors. Unit conditions may influence the discretionary leadership displayed. And the nature of the leader as well as individual subordinates may play an important role. Inclusion of macro variables should not automatically come at the exclusion of group and individual factors. The data here and elsewhere suggest that group and task characteristics should not be dropped from consideration. The linkage among these factors and the more macro conditions in influencing the success of discretionary leadership awaits examination.

In summary, this research has focused on an area where the boundaries are not clearly visible. By many standards the current investigation is a crude attempt to explore new ground. We may have missed a number of important findings in our attempt to plot an overall picture. More detailed analyses of specific aspects of environment, context, structure, and leadership effectiveness await future investigation. Basic research often raises as many questions as it addresses. This research demonstrates that it is possible, feasible, and desirable to begin charting a new approach to leadership effectiveness. The environment of the unit, its context, and its structure do make a difference in how discretionary leadership relates to unit success. Now the challenge is to more fully investigate how and why.

Applications

Some lines of basic research clearly suggest simple and straightforward applications to the day-to-day affairs of complex organizations. In many instances, however, basic research needs to be refocused to reveal some of the more important and immediate applications. So it is with the Multiple Influence Model of Leadership. Our applications focus on military units such as those in the present sample. Strategies are emphasized for guiding performance and employee maintenance efforts assuming subsequent refinements and tests of the model are successful. The handling of the applications also rests on three other important assumptions:

1. Dramatic increases in unit performance and employee maintenance are not likely unless there are dramatic alterations in the environment, context, or structure of the units. Such long-term strategic questions are beyond the scope of the model as presently formulated.

2. With existing resources and personnel, there are severe limitations on costly experimentation. Gradual, incremental refinements are more realistic.

3. Not all units can have outstanding performance and employee maintenance. There is some trade-off between consistent performance across units where almost all meet minimum standards and more varied performance across units where some are outstanding and some are below standard.

The model and supporting data reinforce some traditional notions. First, the data suggest that environmental, contextual, and structural conditions should be systematically considered. Complexity does make a difference and the overall design is important. Here, for instance, small variations in structure were associated with employee maintenance. Second, the traditional military emphasis on leadership is supported. Discretionary leadership was positively associated with more favorable employee maintenance and key aspects of unit performance. Even in units where leadership impact would be expected to be minimal, discretionary leadership makes a difference. But it is in the combination of setting and discretionary leadership where new advances in military administration may be most clearly seen. The model suggests it may be possible to use different approaches to the design of units to place more or less emphasis on leadership.

Applications of the model can be illustrated for two quite different types of conditions. In the first, it is assumed that consistency in performance across units is required. In the second, it is assumed that outstanding performance is needed, and that total success for the command is roughly equal to the average success of its component units.

Consistency in Performance. Consistency in performance across units is often critical where a mistake by one unit has dire consequences on others; that is, where total command performance is only as high as the performance of the poorest unit.

Where consistency is desired, higher level command would want to reduce the impact of discretionary leadership. While this may appear to contradict military tradition, it may not. Where discretionary leadership is important, the organization is relying upon the unit head to deliver high performance and employee maintenance. Our data suggest that some leaders can respond appropriately to the setting to engender high performance and employee maintenance. However, some cannot. If total performance is only as high as the performance of the weakest unit, outstanding efforts by successful leaders are lost over time. Total performance regresses to that of the most ineffective leader--the individual unable to adjust to small but important variations in the environment, context, and structure of the unit. Thus, the model implies that variations in the design across units be kept to a minimum where consistency in performance is highly prized.

Of course, it is impossible to develop precisely identical environments, contexts, and structures for all units in a given command. It is possible, however, to design the environmental, contextual, and structural complexity facing unit heads. For instance, our data suggest that additional structural complexity calls for additional discretionary leadership. Structural complexity itself is an overall measure of the problems and opportunities emanating from: (a) vertical specialization and control; (b) horizontal specialization and coordination; and (c) diversity in the vertical and horizontal patterns. Increases in any one of the three yield a more complex structure. Conversely, a decrease in one can offset a corresponding increase in another. For example, assume that new types of specialists (MOS) are added to a particular unit.[14] This increases horizontal specialization and thus the structural complexity facing the unit head. Discretionary leadership becomes much more important. Yet a small modification in vertical specialization and control might offset and increase in horizontal specialization. To continue the example, some duties the unit head performs, such as assigning personnel to ceremonial duties, could be transferred to another leader or eliminated altogether. The net effect of both alterations might be no overall change in structural complexity.

Similarly, environmental and contextual complexity could be adjusted so that virtually all leaders at the same rank faced equally complex settings. This would yield the highest consistency in performance across units. Such consistency can already be seen to a large extent in the current sample. In regard to technological factors (context), the important point to note is that while all supervisors may face equally complex settings, the settings are complex for slightly different reasons.

Analyzing the interplay among setting factors and discretionary leadership highlights the wide variety of choices available to improve the chances of success. An example can illustrate some of these. For a whole host of reasons, it is often necessary and desirable to change the setting of all the elements in a command. An example would be the introduction of

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[14]While such a change would often accompany other modifications in space requirements, standard operating procedures and the like, the focus is on MOS changes to simplify the illustration.

more sophisticated equipment. If consistency in performance is required, the model suggests the following analysis would facilitate the transition from old to new equipment.

New equipment would be a change in technological sophistication. Since some units will receive new equipment before others, those with new equipment have a more complex context (higher technological sophistication) vis-a-vis others. The greater technological sophistication eventually will threaten consistency in performance across units. If unit heads respond to this greater complexity with discretionary leadership, unit success during the conversion period is likely to stay within acceptable limits. If leaders do not respond, the success of the unit is likely to decline and reduce the operational performance of the command. In more common terms, there will be transition problems as the new equipment is installed. The model suggests that several different alternatives should be considered:

1. A corresponding reduction in another aspect of contextual complexity may minimize transition problems. For instance, units with new equipment may be assigned a smaller range of duties, or implementation may begin in units with lower contextual complexity. Command could consider placing new equipment in the smaller units which have a narrower range of duties; experience gained could be used to reformulate supervisory duties and help solve particular problems with implementation.

2. Additional leadership support may be provided units as the new equipment is installed.

3. Basic alterations in leadership requirements may be anticipated and widely broadcasted.

4. Additional training for unit heads concerning both the technical aspects of the equipment as well as implementation problems may be considered.

5. Training nonsupervisory personnel already affiliated with the units may be preferred over training a new group of specialists and later assigning them to units receiving new equipment. This is to reduce an increase in structural complexity which often accompanies implementation of more sophisticated equipment.

6. Particular care should be taken to avoid sudden increases in the complexity of the unit's environment during the transition. For instance, it may be inappropriate to ask unit heads to deal with new external units at the same time they are asked to cope with the new equipment. Thus, implementation may more easily proceed through normal channels of command rather than by introducing them with specialized staff units.

7. Unit heads could be trained in how to increase their discretionary leadership to complement the increase in technological sophistication and cope more successfully with other changes.

As the example suggests, a combination of these could be used to insure smooth implementation. The exact combination would require the judgment of experienced commanders. The model is not a substitute for decisions or experience. It is a guide to help commanders frame and forecast problems, develop alternatives, analyze alternative courses of action, and make a smooth transition.

The Multiple Influence Model may also be applied to more routine administrative problems. Again, we are assuming that the success of each unit has dramatic consequences on the success of the whole command. Again, an example is used to highlight the applied aspects of the Multiple Influence Model of Leadership.

Due to strategic commitments, it is necessary to transfer NCOICs to and from U.S. units. TCC personnel suggested that more technically sophisticated equipment was often used in U.S. units and that these units were often larger than their Korean or European counterparts. The NCOIC transferring from an overseas unit to the United States faces a more more complex context (more sophisticated equipment and larger unit size) than in his or her last assignment. Technical training on fully automated equipment may have been completed 5 years before the new assignment and, in some instances, it may be the NCOIC's first assignment to a unit with fully automated equipment. Facing the more complex context, discretionary leadership is a must just when it is most difficult for the NCOIC to obtain. The new NCOIC, in sum, faces a most difficult transitionary phase.

To reduce the need for discretionary leadership, several modifications could be introduced. In the transition phase, the OIC could take a more active role in the operations of the unit, particularly in regard to less than essential duties. A short review course conducted by civilian technical experts which centered on the unique problems of the more sophisticated equipment could be substituted. Some temporary overlap in assignments could be made. Hands-on training could be combined with a holdover of the outprocessing NCOIC. Transfers could be restricted to the most typical units which have the least environmental and structural complexity.

Where these modifications are not deemed feasible, the model still provides another alternative(s). The data suggest that some leaders can develop discretionary leadership to complement the setting of their unit. Individuals with a history of successful leadership may be transferred into a unit with no visible decline in unit success. Where transfers are required and alterations in the setting are not possible, additional leadership training with an emphasis on detecting specific aspects of complexity in the setting and appropriately responding to each may ease the transition. This alternative is presented last since the development of appropriate training materials, programs, and the like is often expensive. The model provides a range of alternatives which may be assessed on the basis of cost effectiveness.

Let's summarize. Where consistency in performance across units is desired the model suggests the following. Careful attention should be given to the environmental, contextual, and structural complexity of each unit. Since units may be equally difficult to lead for different reasons,

it may be possible to adjust specific components of the macro setting. Where adjustments yield more consistency across units, the need for discretionary leaders is reduced. Where inconsistencies remain it is still possible to maintain consistency in performance via leadership training and/or careful placement of leaders. Leadership training is but one of several alternatives. The model is a guide for decisionmakers. It can be used to help define problems, generate alternatives, evaluate different courses of action, and point toward cost-effective implementation.

Outstanding Performance. Now let's change to the second condition we mentioned. Assume that outstanding performance is needed and that total success for the command is roughly equal to the average success of its component units. Outstanding performance by one unit can offset less than outstanding performance by another. In this condition, command should consider developing macro conditions which allow for considerable variation in discretionary leadership. Over time, successful leaders could be identified, developed, and promoted. The model suggests how this strategy could be developed and implemented.

Variation in the complexity of the macro setting across units establishes the climate for discretionary leadership. The more complex the setting of a unit, vis-a-vis others, the more discretionary leadership is likely to emerge and the more discretionary leadership is likely to make a difference in unit success. Instead of tightly controlling for macro conditions, command could allow environmental, contextual, and/or structural complexity to vary considerably across units. Leaders able to identify specific aspects of macro complexity and who can adjust their discretionary leadership to complement these will likely head more successful units. Over time, individuals with a history of success could be identified and placed in the most critical units. While promoting successful leaders is an Army norm, the model provides detailed information concerning how and why some leaders are more successful than others. The model also suggests which unit heads have the greatest opportunity to exercise discretionary leadership.

Detailed analysis within a command could suggest which components of environmental, contextual, and structural complexity are most important and need special attention by unit heads. In the current sample there were only small variations in contextual complexity across the units. Yet complementing additional contextual complexity with discretionary leadership was particularly important in achieving consistent performance.

Where command is unwilling to accept low unit performance but still wishes to separate effective from ineffective leaders, the model provides specific guidelines for developmental programs. Using simulation exercises, it is possible to systematically vary environmental, contextual, and structural complexity and help leaders develop appropriate patterns of discretionary leadership. Such simulations are already being performed for the technical aspects of modern warfare. The Multiple Influence Model suggests how simulation might be used to train leaders and/or to identify those with high potential.

For many commands, command success depends upon a mixture of the conditions outlined above. That is, teamwork is required, yet outstanding

performance is needed. So long as performance is not too low, outstanding units can partially offset weaker units. Here the model provides some reinforcement for common practice. First, "stronger leaders" are often assigned to more critical units. To this, the model suggests that differences in the environmental, contextual, and structural complexity of the units should be considered in identifying units where leadership is needed. Second, it is possible to achieve acceptable performance via careful attention to organizational design. The model suggests, however, that in addition to the typical structural considerations, key aspects of the environment and context should also be incorporated.

On a more sophisticated level, the model also provides guidance for allocating a limited number of individuals with leadership skills. Those unable, unwilling, and/or not having a history of demonstrating discretionary leadership can be assigned to those more typical units where design factors limit the need for such leadership. Conversely, in less typical and more critical units, the more limited number of individuals with high discretionary leadership can be placed where their unique skills count the most. Such balancing can be complemented by minor alterations in design factors so that either discretionary leadership is emphasized or de-emphasized.

A few of the types of applications stemming from the Multiple Influence Model of Leadership have been outlined. Some of the applications reinforce and expand current military policy by allowing commanders to refine their administrative practices. The model also suggests several different strategies which can be used to improve performance and employee maintenance. For instance, organizational design can be used to emphasize or minimize the importance of leadership at the unit level. The model also helps to identify specifically the most critical aspects of the setting and dimensions of leadership for a particular collection of units. Yet, an overall framework still provides for a minimum of specialized measures when comparing quite different types of units. Of course, implementation should proceed only upon successful replication and development of this approach. It must still be considered experimental and within the domain of basic research. A rigorous examination in a difficult field setting does suggest that applications can be derived from the Multiple Influence Model of Leadership if implemented by knowledgeable and experienced military personnel.

Conclusions

Five major conclusions can be drawn from the examination of the Multiple Influence Model of Leadership:

1. Macro setting variables (environmental, contextual, and structural complexity) are important in analyzing leadership.

2. Discretionary leadership is important and different from supervision or more global estimates of leadership activity.

3. The combined impact of macro setting and discretionary leadership is important in predicting unit success.

4. Lateral leadership is a potentially important aspect of leadership.

5. Combining macro variables and discretionary leadership opens new avenues for applications which can be analyzed on a cost/effective basis. Leadership training is but one alternative.

These five conclusions call for additional research concerning environmental, contextual, and structural conditions alone and in combination with discretionary leadership. The present study is but a beginning.

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A MULTIPLE INFLUENCE MODEL OF LEADERSHIP: TECHNICAL APPENDIXES

Appendix A

On Attempts to Measure Discretionary Leadership

Abstract

This appendix summarizes the efforts made to devise a valid and reliable measure of discretionary leadership applicable to a wide variety of organizational settings. To examine the question of reliability and validity, a modification of the Campbell and Fiske (1959) multitrait-multimethod approach to convergent-discriminant validity was used in four different pilot samples. Data from related studies using the same or similar instruments were also incorporated in the reformulation of the instruments.

The net result was a measure of discretionary leadership for two dimensions which met or surpassed the required psychometric criteria. The reformulated instrument is recommended for those who are attempting to measure discretionary leadership.

Introduction

The purpose of this appendix is to summarize the efforts made to develop an adequate measure of discretionary leadership. It briefly reviews the strategy used for instrument development and presents the results from four pilot samples. Initial efforts suggest that a recent revision of the well-known LBDQ-Form XII (Schriesheim, 1976) contains a number of measurement problems and cannot be used as a base for measuring discretionary leadership. A later revision, developed by Schriesheim (1978) centering on slightly different dimensions of leadership, does provide an adequate foundation for measuring two dimensions of discretionary

leadership. Adequate measurement of discretionary leadership is considered an essential prerequisite needed to investigate the Multiple Influence Model of Leadership. Thus, the success of the final pilot study substantially increased the chances of being able to test adequately the proposed Multiple Influence view of leadership.

The first section below outlines the research strategy. The next section centers on the earlier unsuccessful attempts, while the final section outlines the successful pilot results in Army telecommunications centers.

Initial Research Strategy

Instrument development can be an extremely time-consuming and expensive process. Thus, our strategy was to build upon a well-developed instrument to separate discretionary from non-discretionary leadership and to separate one-on-one from group leadership. Initial efforts focused on Schriesheim's (1976) modification of the Leader Behavior Description Questionnaire (LBDQ-Form XII). The instrument taps two key dimensions of leadership consistently identified in previous instrument development attempts (initiating structure and consideration). (See Hunt, Osborn & Schriesheim, 1978.) Schriesheim's items were designed to tap the leader's behavior toward the group. We modified the response categories to tap discretionary-nondiscretionary leadership. We also modified the previous items to provide a one-on-one referent in addition to a group referent.* Exhibit A-1

*The rationale for the group versus one-on-one referent is provided on page A16.

Exhibit A-1

Group Discretionary Leadership and Leader Behavior Measures

1-5 Method for Sample 1

For the first item in each set select the answer best indicating how your unit head (immediate superior) behaves toward your unit as a whole. For the second item in each set indicate whether that leader behavior is determined primarily at his own volition or whether it is determined primarily by the setting in which he operates. Remember both of these items in the set are for behavior toward your unit as a whole. If you are a manager, think of the unit as all the managers as a group who report to the same superior as you.

		Never	Seldom	About as Often as Not	Very Often	Always	His own volition	The setting in which he operates	
96.	He explains the way the task of the unit should be carried out.	A	B	C	D	E			96.
97.	This is primarily due to (select A or B)						A	B	97.
98.	He explains the part that the unit is to play in the organization.	A	B	C	D	E			98.
99.	This is primarily due to						A	B	99.
100.	He explains rules and procedures to the unit in detail.	A	B	C	D	E			100.
101.	This is primarily due to						A	B	101.
102.	He organizes unit work activities.	A	B	C	D	E			102.
103.	This is primarily due to						A	B	103.
104.	He lets the unit know where it stands in its work.	A	B	C	D	E			104.
105.	This is primarily due to						A	B	105.
106.	He lets the unit know what is expected of it.	A	B	C	D	E			106.
107.	This is primarily due to						A	B	107.
108.	He encourages the unit to use uniform procedures.	A	B	C	D	E			108.
109.	This is primarily due to						A	B	109.
110.	He makes his attitudes clear to the unit.	A	B	C	D	E			110.
111.	This is primarily due to						A	B	111.
112.	He tells the unit which tasks are most important.	A	B	C	D	E			112.
113.	This is primarily due to						A	B	113.
114.	He makes sure that the unit understands his part in it.	A	B	C	D	E			114.
115.	This is primarily due to						A	B	115.
116.	He schedules the work the unit is to do.	A	B	C	D	E			116.
117.	This is primarily due to						A	B	117.
118.	He asks that the unit follow standard rules and regulations.	A	B	C	D	E			118.
119.	This is primarily due to						A	B	119.
120.	He helps the unit make working together more pleasant.	A	B	C	D	E			120.
121.	This is primarily due to						A	B	121.
122.	He goes out of his way to be helpful to the unit.	A	B	C	D	E			122.
123.	This is primarily due to						A	B	123.
124.	He respects the feelings and opinions of the unit.	A	B	C	D	E			124.
125.	This is primarily due to						A	B	125.
126.	He is thoughtful and considerate of the unit as a whole.	A	B	C	D	E			126.
127.	This is primarily due to						A	B	127.
128.	He maintains a friendly atmosphere within the unit.	A	B	C	D	E			128.
129.	This is primarily due to						A	B	129.
130.	He is friendly and approachable towards the unit.	A	B	C	D	E			130.
131.	This is primarily due to						A	B	131.
132.	He does little things to make it pleasant for the unit.	A	B	C	D	E			132.
133.	This is primarily due to						A	B	133.
134.	He treats everyone in the unit as equals.	A	B	C	D	E			134.
135.	This is primarily due to						A	B	135.
136.	He gives the unit advance notice of changes.	A	B	C	D	E			136.
137.	This is primarily due to						A	B	137.
138.	He looks out for the welfare of the unit.	A	B	C	D	E			138.
139.	This is primarily due to						A	B	139.

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Exhibit A-2

Individual Discretionary Leadership Measure

1-5 Method for Sample 1

For each item select the answer best indicating how much discretion your unit head (immediate superior) has to behave in that way toward you as an individual. That is, to what degree can he act on his own as opposed to having his behavior dictated by the setting in which he operates?

		Very Little Discretion	Little Discretion	Some Discretion	Much Discretion	Very Much Discretion	
147.	Explaining the way my job should be carried out.	A	B	C	D	E	147.
148.	Explaining the part that I am to play in the work unit.	A	B	C	D	E	148.
149.	Explaining rules and procedures to me in detail.	A	B	C	D	E	149.
150.	Organizing my work activities.	A	B	C	D	E	150.
151.	Letting me know where I stand in my work.	A	B	C	D	E	151.
152.	Letting me know what is expected of me.	A	B	C	D	E	152.
153.	Encouraging me to use uniform procedures.	A	B	C	D	E	153.
154.	Making his attitudes clear to me.	A	B	C	D	E	154.
155.	Assigning me to particular tasks.	A	B	C	D	E	155.
156.	Making sure that I understand his part in the unit.	A	B	C	D	E	156.
157.	Scheduling the work I am to do.	A	B	C	D	E	157.
158.	Asking that I follow standard rules and regulations.	A	B	C	D	E	158.
159.	Helping me make working on my job more pleasant.	A	B	C	D	E	159.
160.	Going out of his way to be helpful to me.	A	B	C	D	E	160.
161.	Respecting my feelings and opinions.	A	B	C	D	E	161.
162.	Being thoughtful and considerate of me.	A	B	C	D	E	162.
163.	Maintaining a friendly atmosphere with me.	A	B	C	D	E	163.
164.	Being friendly and approachable towards me.	A	B	C	D	E	164.
165.	Doing little things to make it pleasant for me to be a member of his unit.	A	B	C	D	E	165.
166.	Treating me as an equal.	A	B	C	D	E	166.
167.	Giving me advance notice of changes.	A	B	C	D	E	167.
168.	Looking out for my personal welfare.	A	B	C	D	E	168.

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shows the instruments as modified to measure group discretionary-non-discretionary leadership as well as leadership behavior. Exhibit A-2 provides the information for the individual (one-on-one) referent.*

To assess psychometric adequacy, it is necessary to measure leadership and its dimensions several different ways. Essentially the researcher must show that different methods of measurement yield similar ratings of leadership. The instrument in Exhibit A-2 uses a 5 point Likert-type response format ("method"). In addition, other formats ("methods") were incorporated. One asked individuals to attribute a leader's behavior to either the boss or other factors (0-1 method, as in Exhibit A-1). A second format asked respondents to think of an influence pie and to allocate 100 points among various sources of influence (pie method). The Likert (1-5) scale, the 0-1 format and the allocation "pie" were considered three different "methods." Further, a one item global estimate of the leader's discretion was used as a baseline for assessing the overall discretion of the leader. Exhibit A-3 summarizes the methods used in Sample 1.

The initial plan was to test the instruments with a convenience sample, interview individuals who had taken the test, and then modify items so that they were appropriate for the military sample to be used in our major study. Unfortunately, the results from the first pilot sample were not generally supportive. Thus,

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*Group and individual measures are provided for only one measurement "method."

Exhibit A-3

Measures, Methods, and Descriptive Statistics

for Discretionary Leadership in Sample 1

(n=54)

Measures & Methods	Descriptive Statistics		
	Mean	Skewness	Reliability
Group Discretion			
Initiating Structure			
1-5 Method	44.4	-.38	.91[a]
0-1 Method	16.6	2.5	.92
Pie Method	20.0	1.2	NA[b]
Single Item Method	3.7	-.74	NA
Consideration			
1-5 Method	39.5	-.72	.79
0-1 Method	11.7	4.5	.93
Pie Method	35.5	.72	NA
Single Item Method	4.0	-1.2	NA
Individual Discretion			
Initiating Structure			
1-5 Method	44.2	-.25	.93
0-1 Method	17.0	2.3	.70
Consideration			
1-5 Method	39.6	-.65	.96
0-1 Method	12.1	2.9	.89

[a]Spearman-Brown corrected split-half correlations.

[b]NA = not applicable.

some modifications were introduced and a second pilot sample was selected. As we will note later, results from the second sample were equally discouraging.

Specific Tests for Psychometric Adequacy

Several tests were conducted in order to assess the reliability and validity of the measures. In the evaluation of convergent and discriminant validity, we followed a modified version of Campbell's and Fiske's (1959) multitrait-multimethod design. Essentially, the instrument should pass five critical tests:

1. Scores should be normally distributed across the range of possible scores.
2. The scale should show high internal consistency reliability.
3. The scale should demonstrate convergent validity. That is, two measures of the same dimension using different response methods should be highly correlated. For example, initiating structure using the 1-5 method should be highly correlated with initiating structure using the 0-1 method.
4. Discriminant validity should be demonstrated by each construct. That is, different dimensions should have low correlation when measured by the same method as well as when measured by different methods.
5. Correlations between different measurement methods of a single dimension should be higher than correlations between different dimensions using the same method.

The first three tests are relatively straight-forward, although absolute standards for their evaluation have not been established. In Test 1, the distribution of scores should be normal, not highly skewed. This indicates whether or not the items comprising the scale have adequate endorsement frequency, and possess the necessary variability. In Test 2, satisfactory internal consistency reliability is a prerequisite for the instrument to be valid. Split-half correlations (corrected for length using the Spearman-Brown formula) should be 0.6 or greater (Nunnally, 1967.) For Test 3, different measures of the same trait should be significantly greater than zero in order to demonstrate convergent validity. The samples used here were relatively small (from 27 to 54 subjects) and quite heterogeneous. (In only one sample were respondents from the same organization.) Given this size and heterogeneity, an arbitrary standard of 0.4 was chosen for acceptable convergent validity.*

Tests 4 and 5 are used to establish the discriminatory power of the scales. In Test 4 correlations between different traits should be low, thus reflecting the measurement of distinct concepts. Further correlations between different dimensions should be low when using either different methods or when they are measured by the same method. For example, if consideration and initiating structure are distinct dimensions of leadership, then the correlation between these two dimensions should be low whether: (a) one

*Both small sample size and heterogeneity increase the standard error and, thus, a cut-off less than the .05 level was used.

is measured by the 0-1 method and the other is measured by the 1-5 method; or whether (b) both are measured by the 0-1 or 1-5 methods. In Test 5, correlations between different methods of measuring a single dimension should be higher than correlations between different dimensions measured by the same method. This means that dimension differences should be larger than method differences. This is the most difficult of all the tests and is rarely met by self-report instruments since they are subject to varying degrees of method bias. Eliciting responses from an individual using one type of response format (i.e., all 1-5 or all 0-1 methods) typically produces some consistency in scores above and beyond any common content variance. To pass this method test, the convergent validity correlation between the same traits using different methods is compared with the correlation between dimensions which use the same method. For instance, initiating structure using the 0-1 method when correlated with initiating structure measured by the 1-5 method should be larger than: (a) the correlation between initiating structure using the 0-1 method and consideration using the 0-1 method, and (b) the correlation between initiating structure using the 1-5 method and consideration using the 1-5 method. This test assesses the relative contribution of content and method variance in the correlation among scale scores.

In summary, each instrument should pass five rigorous tests. These tests evaluate the instrument's: (1) normality; (2) internal consistency reliability; (3) convergent validity; (4) discriminant validity; and (5) susceptibility to method bias. In addition,

these criteria represent a hierarchical order of importance. Test 1 is a prerequisite for Test 2, successful completion of Test 2 is a prerequisite for evaluation by Test 3, and so forth. Failure to pass a previous test reduces the meaningfulness of subsequent tests. We should note, however, that the failure to pass any or all tests may be due to inadequate instruments, inadequate theory, or some combination of both.

Results

This section provides results for the instrument development efforts in four samples. Before considering results, however, it is useful to review a few key notions. Initial efforts concentrated on a revision of the LBDQ-Form XII. Two dimensions of leadership were examined--initiating structure (IS) and consideration (CON). Some scholars have argued that there is a difference between how the leader treats the group as a whole and how the leader treats individual subordinates one-on-one. Thus, items were developed for both individual or one-on-one and group discretionary leadership. Four methods were employed in the group leadership measures. These were: Likert 1-5, 0-1, pie, and single item. For examining individual leadership, only two methods were employed--the 1-5 and 0-1 methods.* For each sample the following propositions

*While it would have been desirable to use four methods for individual leadership as well, instrument length precluded using all four methods for both group and individual leadership. Since the bulk of underlying leadership theory as well as our own Multiple Influence approach has a group emphasis, we opted to use the more complete set of methods with group leadership.

were examined. One, was there convergent-discriminant reliability and validity for the measures of group discretion? Two, was there convergent-discriminant reliability and validity for individual discretion? Three, was there a measurable difference between estimates of individual and group leadership?

Sample 1

The first sample consisted of 54 respondents. There were approximately an equal number of doctoral students, master's students, and university employees. There was also a small number of non-university employees. Most of the sample was obtained from individuals in the Dallas-Fort Worth metroplex, supplemented by a smaller number of people from southern Illinois. Approximately 20 percent of the individuals were interviewed after completing the questionnaire.

Exhibit A-3 provides the mean, skewness, and reliabilities for all measures of discretionary leadership. All the instruments, except the 0-1 method, pass the first test--that of a normal distribution (where the skewness coefficient is close to 1.0). However, for all estimates of discretionary leadership, the skewness for the 0-1 response format is high. Item analysis suggested that only a few items were considered primarily under the control of the boss. The exhibit also provides data concerning internal consistency reliabilities for the 1-5 response method and the 0-1 method. The Spearman-Brown Split-Half correlations suggest that these measures possess adequate reliability.

Test for Group Discretionary Leadership. Data for assessing convergence, discrimination, and method bias for group discretionary leadership for Sample 1 are provided in Exhibit A-4. Correlations underlined are used to answer the convergence question. Only the 1-5 and pie methods exceed the .40 cut-off. For assessing discrimination, the correlations within the boxes in Exhibit A-4 should be compared. The underlined correlations should be greater than the others. Only the 0-1 and pie methods pass this test for discrimination. Finally, there is the question of method bias. Circled correlations should be less than underlined correlations for each column and row. The 0.82 initiating structure-consideration correlation is far greater than the others, suggesting that there are serious questions of method bias for the 1-5 approach. Intercorrelations between initiating structure and consideration for the 0-1, pie, and single item methods are also discouraging.

Test for Individual Discretionary Leadership. Following our earlier rationale, only two methods were used for individual leadership. The 1-5 and 0-1 methods were used since internal consistency reliabilities could be computed for both. Data in Exhibit A-5 suggest that the convergence correlations are too low (underlined correlations of .32 and .36). There is, however, adequate discrimination (e.g., the two measures of initiating structures are more highly correlated than initiating structure and consideration measured in different ways). However, the convergence correlations are not higher than the method asscciations. This is particularly

Exhibit A-4

Group Discretionary Leadership Data (n=54) for

Convergence, Discrimination,and Methods Test

in Sample 1

		1-5 Method		0-1 Method		Pie Method		Single Item (SI) Method	
		IS	CON	IS	CON	IS	CON	IS	CON
1-5	IS*	1.00	(.82)						
	CON*	(.82)	1.00						
0-1	IS	35	.18	1.00	(.64)				
	CON	35	.34	(.64)	1.00				
Pie	IS	41	.27	.38	.18	1.00	(.47)		
	CON	42	.44	.16	.21	(.47)	1.00		
SI	IS	.06	-.16	.12	-.04	-.03	-.06	(.70)	1.00
	CON	.04	-.02	.11	.08	.07	.16	1.00	(.70)

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations(heterotrait-monomethod r < monotrait-heteromethod r).

Exhibit A-5

Individual Discretionary Leadership Data (n=54)

for Convergence, Discrimination, and

Methods Tests in Sample 1

		1-5 Method		0-1 Method	
		IS	CON	IS	CON
1-5	IS*	1.00	(.77)		
	CON*	(.77)	1.00		
0-1	IS	.32	.18	1.00	(.37)
	CON	.19	.36	(.37)	1.00

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations (heterotrait-monomethod r < monotrait-heteromethod r).

true for the 1-5 method where initiating structure and consideration are correlated .77.

In sum, the initial attempts at developing a reliable and valid instrument for discretionary leadership failed. The primary problem appeared to be in the very high method correlations, particularly when using the 1-5 method. Exhibit A-6 summarizes the results for all the tests in a convenient format.

Individual versus Group Leadership in Sample 1. At this point we need to digress from discussing the development of our instrument to report data on early concern expressed in our original proposal. At the time the proposal was written, there was considerable concern over the potential difference between group and one-on-one leadership. The argument has three components. First, some argue leadership is, in reality, an interpersonal relationship between a leader and a follower. Second, it is contended that leaders treat subordinates quite differently so that an average score for all individuals masks important leader-follower dynamics. Third, Graen and his associates (e.g., Graen & Cashman, 1975) argue, with some empirical support, that how the leader treats an "ingroup" or inner circle may be different than how the leader treats less favored subordinates. Following this line of reasoning, we initially speculated that individual discretion might be built on a different basis than group discretion. Further, we speculated that the mix of group and individual discretion might be important in explaining unit performance and satisfaction.

Exhibit A-6

Summary of Results for Discretionary Leadership Measures in Sample 1

Measure & Methods	Tests				
	1	2	3	4	5
Group Discretion	Skewness	Reliability	Convergence	Discrimination	Method
Initiating Structure					
1-5 Method	OK	OK	With pie	With 0-1 & pie	NO
0-1 Method		OK	None	With 1-5 & pie	NO
Pie Method	OK	NA	1-5	With 1-5 & pie	NO
Single Item Method	OK	NA	None	None	NO
Consideration					
1-5 Method	OK	OK	With pie	With 0-1 & pie	NO
0-1 Method		OK	None	1-5, pie & Single Item	NO
pie Method	OK	NA	With 1-5	1-5, 0-1 & Single Item	
Single Item Method	OK	NA	None	With 0-1 & pie	NO
Individual Discretion					
Initiating Structure					
1-5 Method	OK	OK	None	0-1	NO
0-1 Method	OK	OK	None	1-5	NO
Consideration					
1-5 Method	OK	OK	None	0-1	NO
0-1 Method	OK	OK	None	1-5	NO

NA = Not applicable.

Thus, it was necessary to measure both individual and group leadership to ascertain whether or not they were conceptually and empirically distinct. Is there a measurable difference between individual and group leadership? To answer this question, we again relied upon a modified version of the Campbell and Fiske approach. However, this time, convergence and discrimination were not expected. If group and individual leadership are different, they should be measuring different concepts and should not pass the tests for measurement of the same concept and dimensions. Data in Exhibit A-7 suggest that measured differences in group and individual leadership do not exist in Sample 1. The LBDQ-Form XII (as modified) for individual and group leadership displays convergence, discrimination, and passes the method bias test. We conclude, therefore, that both are measuring the same concept. In summary, there was no measured difference in group and individual leadership in Sample 1.

Samples 2 and 3

The results from Sample 1 were quite disappointing, particularly since method variance problems confounded the translation of the modified LBDQ into a measure of discretionary leadership. We therefore decided to revise the instrument in an attempt to minimize these problems. Interviews with respondents suggested that revamping of instructions might be particularly important. At about this time, also, Yukl and Nemeroff (1979) provided data suggesting that grouping the items of a single dimension together in a questionnaire reduces method correlations. Thus, items were grouped

Exhibit A-7

Correlations (n=54) Between Individual and Group Measures of Leader Behavior in Sample 1

	Individual Leader Behavior		Group Leader Behavior	
	IS	CON	IS	CON
Individual Leader Behavior				
IS*	1.00	(.47)		
CON*	(.47)	1.00		
Group Leader Behavior				
IS	.80	.41	1.00	(.51)
CON	.47	.84	(.51)	1.00

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations (heterotrait-monomethod r < monotrait-heteromethod r).

together. Feedback from sample interviewees suggested some difficulty with the instructions regarding the pie method. Those instructions were revamped. More clarification was provided concerning individual versus group leadership. The response format for the 0-1 method was modified to try to reduce skewness. And the single item measure was dropped. It was hoped these modifications would yield a usable instrument for individual and group discretion.

Examples of the modifications made for Sample 2 are found in Exhibit A-8. As before, there are multiple methods for tapping initiating structure and consideration for both group and individual leadership.

Results for Sample 2. Sample 2 consisted of 79 individuals from the Dallas-Fort Worth metroplex. There was a mix of graduate and undergraduate students as well as a few other individuals. A large majority of the sample was currently employed. These people described their supervisor on all items and also asked their supervisors to evaluate their own discretionary leadership. The set of managerial responses constituted Sample 3.*

The measures, methods, and data concerning the mean, skewness, and reliability for discretionary leadership are provided in Exhibit A-9. The data suggest that the modifications did yield

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*Essentially, our respondents were asked to give their boss a questionnaire packet. The packet contained a letter from us, the promise of feedback concerning a given individual supervisor's score, and a pre-paid, pre-addressed envelope to be returned to us.

Exhibit A-8

Examples of Measures Used in Sample 2

A. Instructions and Sample Items for Measuring Discretionary Leadership 0-1 Method

INSTRUCTIONS. You are beginning A NEW SECTION. For the items in this section you are asked to think about your IMMEDIATE SUPERVISOR'S (boss') leader behavior and how it is determined by various factors.

A. These factors are of two kinds: the boss himself and the setting within which he operates. The setting consists of 1) written policies/procedures; 2) upper management directives; 3) other supervisors at your boss' level; 4) people in your work unit besides yourself; 5) job requirements in your work unit; 6) you, yourself; and 7)any number of outside forces.

B. In some cases, almost all the boss' leader behavior may be determined by himself. In others (such as, say, a highly bureaucratized organization) almost all will be determined by one or more of these other factors or the combination of other factors.

C. The factors may determine differently your boss' behavior toward you as an individual and his behavior toward the group. LEADER BEHAVIOR TOWARD THE GROUP is the boss' behaviors whenever he supervises two or more people together such as in group meetings, project team meetings, staff meetings, etc. FOR EXAMPLE, the boss might have relatively more determination over his behavior (as compared with the factors in the setting) toward you as an individual than in his behavior toward the group or vice versa.

D. Likewise, the FACTORS may DETERMINE differently your boss' considerate, human relations-oriented behavior and his task-oriented structuring behavior.

CONSIDERATE BEHAVIOR is that directed toward making things warm and friendly, helping and providing advance notice of changes and being concerned about the welfare of subordinates.

TASK-ORIENTED STRUCTURING BEHAVIOR is that directed toward structuring the job situation so people know what and how they are to do their job, where they fit, where the leader fits, etc.

FOR THE FOLLOWING ITEMS select the answer best indicating whether your boss' leader behavior TOWARD YOU AS AN INDIVIDUAL is determined primarily by himself or primarily by the combination of factors in the setting in which he operates. These are the factors mentioned above(WRITTEN POLICIES;UPPER MANAGEMENT DIRECTIVES;OTHER SUPERVISORS; PEOPLE IN YOUR UNIT;YOU;JOB REQUIREMENTS;OUTSIDE FORCES.)

The first 12 items are for task-oriented structuring ; the last 10 for consideration.

INDIVIDUAL TASK-ORIENTED STRUCTURING	Primarily By Boss	Primarily By Other Factors	
1. Explaining the way my job should be carried out	A	B	1.
2. Explaining the part that I am to play in the work unit	A	B	2.
3. Explaining rules and procedures to me in detail	A	B	3.
4. Organizing my work activities	A	B	4.
5. Letting me know where I stand in my work	A	B	5.
6. Letting me know what is expected of me	A	B B	6.
7. Encouraging me to use uniform procedures	A	B	7.
8. Making his attitudes clear to me	A	B	8.
9. [illegible]	A	B	[illegible]
10. [illegible]	A	B	[illegible]
11. Scheduling the work I am to do	A	B	11.

B. Instructions and Sample Items for Measuring Discretionary Leadership Pie Method

INSTRUCTIONS: DO NOT USE THE ANSWER SHEET FOR THIS PAGE AND PLEASE RETURN THIS PAGE WITH YOUR ANSWER SHEET. Think about your boss' leader behavior and how it is determined by the various factors mentioned at the beginning of this section. Below are 'allocation pies' to divide up the degree to which each of these factors determines your boss' leader behavior.

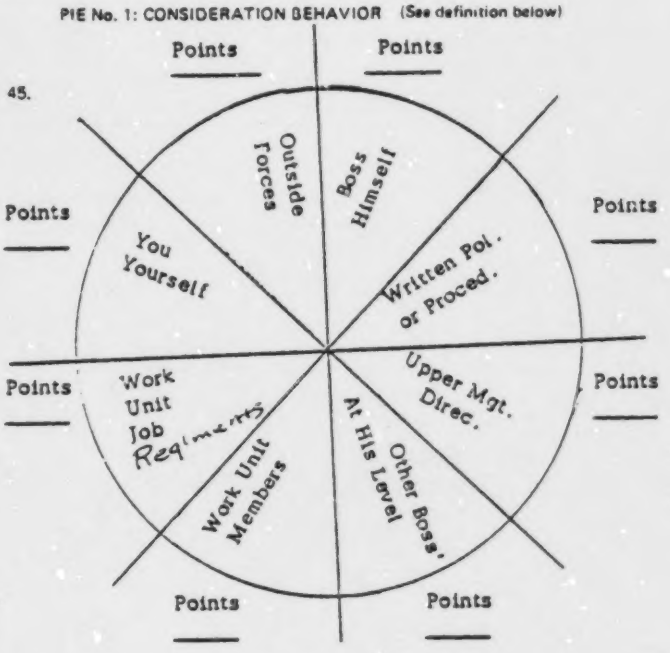
A. Divide 100 points among the factors and write the number in the blank beside each. The total points may not exceed 100 and may range from 0 up, for each factor. Please make sure you have distributed the entire 100 points.

B. AS AN EXAMPLE, if you thought your boss' behavior was primarily or mostly determined by his own choice you might assign him, say, a majority of the 100 points. That would leave the remaining points to be distributed across one or more of the 'setting factors' If you thought his behavior was primarily determined by factors in the setting you would assign a relatively larger score than above to them and a relatively smaller score to the boss himself.

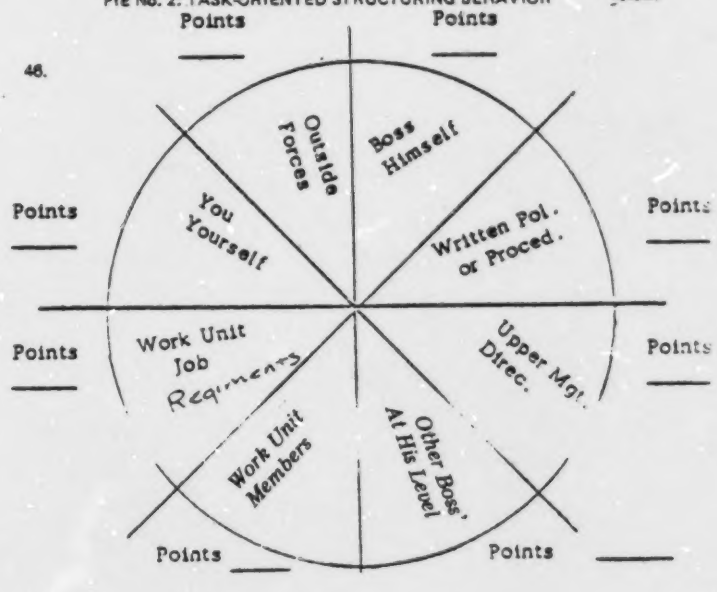
C. Make these judgments for your BOSS' BEHAVIOR TOWARD THE GROUP'

D. The first pie is for CONSIDERATION and the second for TASK-ORIENTED STRUCTURING

PIE No. 1: CONSIDERATION BEHAVIOR (See definition below)



PIE No. 2: TASK-ORIENTED STRUCTURING BEHAVIOR (see definition below)



CONSIDERATE BEHAVIOR is that directed toward making things warm and friendly, helping and providing advance notice of changes and being concerned about the welfare of subordinates.

TASK-ORIENTED STRUCTURING BEHAVIOR is that directed toward structuring the job situation so people know what and how they are to do their job, where they fit, where the leader fits, etc.

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Exhibit A-9

Measures, Methods, and Descriptive Statistics

for Discretionary Leadership in Sample 2

(n=79)

Measures and Methods	Descriptive Statistics		
	Mean	Skewness	Reliability
Group Discretion			
Initiating Structure			
1-5 Method	41.6	-.09	.91[a]
0-1 Method	7.0	-.3	.86
Pie Method	20.7	.94	NA[b]
Consideration			
1-5 Method	37.3	-.65	.90
0-1 Method	6.7	-.87	.85
Pie Method	30.7	.36	NA
Individual Discretion			
Initiating Structure			
1-5 Method	41.4	-.29	.94
0-1 Method	6.6	.17	.72
Consideration			
1-5 Method	38.1	-1.0	.93
0-1 Method	6.8	-.95	.74

[a]Spearman-Brown corrected split-half correlations.

[b]NA = not applicable.

some improvement. Particularly important was the reduction in skewness for the 0-1 method. Reliabilities were somewhat higher than in the previous sample as hoped from the grouping of items and more detailed instructions.

Exhibit A-10 shows data for the convergence, discrimination, and methods tests for group discretionary leadership. Convergence is acceptable for the 1-5 and 0-1 methods, while all methods pass the test for discrimination. Again, however, the intercorrelations among the dimensions for any one method swamp all other correlations. Similar data for individual leadership are in Exhibit A-11. Grouping of items did not help the method variance problem. A larger study using a revised version of the LBDQ to measure leader behavior showed much the same findings (Schriesheim & DeNisi, 1978). Thus, we concluded that using LBDQ initiating structure and consideration to develop a subordinate perception measure of leader discretion was not fruitful. This can be more clearly seen in the summary shown in Exhibit A-12 for Sample 2.

Individual and Group Leadership in Sample 2. Data concerning the potential split between individual and group leadership were also reexamined. Data in Exhibit A-13 clearly suggest no measured differences in individual and group perceptions of leader behavior. It was decided to drop the distinction and concentrate on the group measures since the group approach has received the most attention and was most consistent with the major thrust of our Multiple Influence Approach to Leadership. We suggest that the distinction

Exhibit A-10

Group Discretionary Leadership Data (n=79) for Convergence, Discrimination, and Methods Tests in Sample 2

		1-5 Method		0-1 Method		Pie Method	
		IS	CON	IS	CON	IS	CON
1-5	IS*	1.00	(.64)				
	CON*	(.64)	1.00				
0-1	IS	.43	.14	1.00	(.69)		
	CON	.12	.39	(.69)	1.00		
Pie	IS	.26	.14	.21	.06		(.38)
	CON	-.08	.22	.20	.21	(.38)	

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r)

Method Test: Circled correlations should be less than underlined correlations (heterotrait-monomethod r < monotrait-heteromethod r).

Exhibit A-11

Individual Discretionary Leadership Data (n=79)

for Convergence, Discrimination, and

Methods Test in Sample 2

		1-5 Method		0-1 Method	
		IS	CON	IS	CON
1-5	IS*	1.00	(.71)		
	CON*	(.71)	1.00		
0-1	IS	.40	.14	1.00	(.43)
	CON	.27	.45	(.43)	1.00

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations(heterotrait-monomethod r < monotrait-heteromethod r).

Exhibit A-12

Summary of Results for Discretionary Leadership Measures

in Sample 2

	Tests				
	1	2	3	4	5
Measures & Methods	Skewness	Reliability	Convergence	Discrimination	Method
Group Discretion					
Initiating Structure					
1-5 Method	OK	OK	With 0-1	With 0-1 & Pie	None
0-1 Method	OK	OK	With 1-5	With 1-5 & Pie	None
Pie Method	OK	NA	None	With 1-5 & Pie	None
Consideration					
1-5 Method	OK	OK	With 0-1	With 0-1 & Pie	None
0-1 Method	OK	OK	With 1-5	With 1-5 & Pie	None
Pie Method	OK	NA	None	With 1-5 & 0-1	None
Individual Discretion					
Initiating structure					
1-5 Method	OK	OK	With 0-1	With 0-1	None
0-1 Method	OK	OK	With 1-5	With 1-5	None
Consideration					
1-5 Method	OK	OK	With 0-1	With 0-1	None
0-1 Method	OK	OK	With 1-5	With 1-5	None

Exhibit A-13

Correlations (n=79) Between Individual and Group

Measures of Leader Behavior in Sample 2

	Individual		Group	
	IS	CON	IS	CON
Individual				
IS*	1.00	(.71)		
CON*	(.71)			
Group				
IS	.71	.49	1.00	(.45)
CON	.53	.77	(.45)	1.00

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations (heterotrait-monomethod r < monotrait-heteromethod r).

between individual and group leadership may be real and conceptually important for predicting some criteria, but we are not able to make a separate, distinct measurement at this stage of instrument development.

Self Perceptions of Discretionary Leadership--
Sample 3

Sample 3 consisted of 27 managers in diverse organizations operating in the Dallas-Fort Worth metroplex. Here individuals were asked to describe their own behavior toward subordinates on both leader behavior and the 1-5, 0-1, and pie methods for discretionary leadership. The track was taken in an attempt to devise another approach to measuring discretion if the employee perception route failed. Unfortunately, data provided in Exhibit A-14 are not very promising. Only the 1-5 and 0-1 initiating structure convergence correlation meets the criterion and even here there is a lack of discrimination (0.48 is less than the IS-CON correlation of 0.51 across methods). As before there were considerable problems with method bias. We concluded that self-reports were not appropriate for accessing discretionary leadership. The psychometric strengths found with employee perceptions were lost with the self-report approach.

Rethinking on the Concept and Measurement of Discretionary Leadership

Pilot data can be useful if they both help refine concepts and move the research toward more psychometrically sound methods of measurement. With less than satisfactory results from three

Exhibit A-14

Group Discretionary Leadership Self-Report Data (n=27)

for Convergence, Discrimination, and Methods Tests

in Sample 3

		1-5 Method		0-1 Method		Pie Method	
		IS	CON	IS	CON	IS	CON
1-5	IS*	1.00	(.54)				
	CON*	(.54)	1.00				
0-1	IS	.48	.51	1.00	(.13)		
	CON	.06	-.12	(.13)	1.00		
Pie	IS	-.01	.15	.14	-.02	1.00	(.63)
	CON	-.25	.19	-.19	.02	(.63)	1.00

*IS = Initiating structure; CON = Consideration.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations(heterotrait-monomethod r < monotrait-heteromethod r).

pilot samples using a variety of approaches to measure discretionary leadership, we decided to take a closer look at the concept of discretion.

Originally, we assumed that leader behavior could be divided into discretionary and required portions much as one would cut a pie into two different slices. This simplifying assumption lead to items which asked respondents, either implicitly or explicitly, to cut leader behavior into slices. Respondents, however, could not make this distinction and saw discretionary and required leadership as independent. Thus, we took another look at the measurement of leadership without changing the conceptual definition of discretionary leadership as influence over and above that vested in the managerial role.

Looked at in a different manner, the essence of discretionary leadership is embodied in the phrase "he can and he does." Actions taken in opposition to external forces "he can't but tries anyway" may be influence attempts, but they are clearly not discretionary leadership. Failure to act when action can be taken shows opportunity lost. Thus, "he could but doesn't" constitutes another important phrase. Finally, it was recognized that some leaders cannot act and do not attempt to build influence beyond that required. Thus, the phrase "can't and doesn't" appeared to be important.

Via informal discussions with leaders and colleagues, we attempted to find out whether they could adequately categorize the

leader behavior of individuals into one of our four phrases: (1) can and does; (2) can't but tries anyway; (3) could but doesn't; and (4) can't and doesn't). Individuals with some experience in describing leaders who had been in their posts for several months had little difficulty using this format. Further, we asked them to describe the requirements placed on leaders, as a crude measure of required leadership. Again we informally found this approach to be useful and easily understood. We returned to our pilot measures and also attempted to develop a more straightforward Likert approach. We wanted to avoid the simple 1-5 method given our earlier problems with method bias. The pie approach yielded the greatest separation between the dimensions but had questionable convergence. We devised a modified version of point allocations asking respondents to attribute the behavior to either the leader or other circumstances.

Lengthy discussions with colleagues and some additional instrument development work by Schriesheim (1978) based on previous versions of the LBDQ provided another base measuring instrument. Here four distinct dimensions of leadership were proposed to replace the traditional initiating structure-consideration split (see Exhibit A-15). Three of the dimensions centered on task related behaviors. They are: rules and procedures, work assignments,and role clarity. Data from several samples (Schriesheim, 1978; Jermeir & Berkes, 1979) suggested that these were less interrelated than the two-dimension LBDQ but used similar items. The fourth dimension, called support, appeared similar in many ways to the old consideration. We felt a more detailed division of task behaviors might allow us to more

Exhibit A-15

Discretionary and Required Leadership Measures for Sample 4

A. Discretionary Leadership - Categorical Method

Here we are interested in how your boss behaves toward you on the job. For each of the items below, circle the most appropriate response.

MY BOSS:	He can and Does	He could but Doesn't	He can't but Tries Anyway	He can't and Doesn't	Don't Know	
1. Explains the level of performance that is expected of me	A	B	C	D	X	1
2. Helps make working on my job more pleasant	A	B	C	D	X	2
3. Tells me how I am to go about my job	A	B	C	D	X	3
4. Puts me on specific jobs	A	B	C	D	X	4
5. Considers my feelings	A	B	C	D	X	5
6. Explains the quality of work that is expected of me	A	B	C	D	X	6
7. Emphasizes rules and regulations which affect how I do my job	A	B	C	D	X	7
8. Gives me broad job assignments	A	B	C	D	X	8
9. Decides how I am to do my job	A	B	C	D	X	9
10. Looks out for my personal welfare	A	B	C	D	X	10
11. Gives specific explanations of what is expected of me or my job	A	B	C	D	X	11
12. Carefully defines what jobs I am to do	A	B	C	D	X	12
13. Does things to make my job more pleasant	A	B	C	D	X	13
14. Gives me specific work assignments	A	B	C	D	X	14
15. Explains what is expected of me on my job	A	B	C	D	X	15
16. Maintains a friendly working relationship with me	A	B	C	D	X	16
17. Gives me instructions on how to do my job	A	B	C	D	X	17
18. Lets me decide what specific duties to perform	A	B	C	D	X	18
19. Gives me clear goals to reach on my job	A	B	C	D	X	19
20. Lets me develop my own methods for doing my job	A	B	C	D	X	20

B. Discretionary Leadership - Point Method

Think of your boss' leader behavior as being controlled by himself and by a combination of outside factors. The outside factors include: UPPER BRASS DIRECTIVES, OTHER SUPERVISORS AT HIS LEVEL, WRITTEN POLICIES, JOB REQUIREMENTS, OTHERS IN YOUR WORK UNIT, YOU, PLUS FACTORS OUTSIDE THE TCC.

For each of the four behaviors below allocate 100 points between your boss' contr and the control by outside factors. For example, if you gave your boss 30 points that would mean the remaining 70 points would go to outside factors.

1. Clarifying what is expected of me in my work

   _____ points for boss

2. Assigning me to specific work tasks

   _____ points for boss

3. Specifying rules, procedures and policies for me to use or follow in executing my job

   _____ points for boss

4. Maintaining a pleasant and friendly working relationship with me

   _____ points for boss

C. Required Leadership

Some leaders are required to do more than others. These requirements may stem from UPPER BRASS DIRECTIVES, OTHER SUPERVISORS AT HIS LEVEL, WRITTEN POLICIES, JOB REQUIREMENTS, OTHERS IN YOUR WORK UNIT, YOU, FACTORS OUTSIDE THE TCC, etc. To what extent is your boss required to do the following:

	Few Requirements				Many Requirements
1. Maintain a pleasant and friendly working relationship with me	1	2	3	4	5
2. Assign me to specific work tasks	1	2	3	4	5
3. Specify rules, procedures, and policies for me to use in executing my job	1	2	3	4	5
4. Clarify what is expected of me in my work	1	2	3	4	5

clearly differentiate between dimensions at both the conceptual and measurement levels. We were ready to pilot a revised version of our discretionary leadership instrument with a more homogeneous sample centering on individuals with similar tasks in one organization. Here we selected a pilot subsample of Army telecommunications centers from the population of centers which was to serve as the base for the present study.

The sample size for the pilot communications sample (Sample 4) was thirty-eight. Appendix B explains the procedures used and problems encountered with the mail questionnaire approach used. The pilot allowed us not only to check our revised instruments but to test the adequacy of our mail questionnaire approach. Changes could then be made to both instruments and procedures before the present study was conducted.

Results for Sample 4

Exhibit A-16 shows the mean, skewness, and reliability for the new approach to discretionary leadership. Skewness is not a problem and the reliabilities are more than acceptable.

Exhibit A-17 shows results for the convergence, discrimination, and method tests. All convergence correlations are acceptable for all dimensions. Discrimination comparisons are acceptable for some sets of dimensions but not others. When all dimensions are considered, role clarity and support are acceptable. Work assignments is acceptable if role clarity is dropped while rules and procedures also passes this test if role clarity is not considered. Moving to the most difficult test--that for method variance, the range

Exhibit A-16

Measures, Methods, and Descriptive Statistics for Group Discretionary Leadership in Sample 4 (n=38)

Measures and Methods	Descriptive Statistics		
	Mean	Skewness	Reliability
Categorical Method			
Role Clarity	1.58	-.55	.89*
Work Assignments	1.08	-.33	.94
Rules & Procedures	1.13	-.45	.85
Support	1.66	-.87	.84
Point Method			
Role Clarity	47.3	.07	NA**
Work Assignments	51.2	.07	NA
Rules & Procedures	42.3	.45	NA
Support	65.2	-.52	NA

*Spearman-Brown corrected split-half correlations.

**Not applicable.

Exhibit A-17

Group Discretionary Leadership Data (n=38)

for Convergence, Discrimination, and

Methods Tests in Sample 4

	Categorical				Point			
	RC	WA	RP	SUPP	RC	WA	RP	SUPP
Categorical Method								
RC*	1.00							
WA*	(.79)	1.00						
RP*	(.80)	(.68)	1.00					
SUPP*	(.57)	(.76)	(.50)	1.00				
Point Method								
RC	.73	.56	.48	.46	1.00			
WA	.55	.52	.33	.32	(.76)	1.00		
RP	.48	.26	.45	.29	(.55)	(.49)	1.00	
SUPP	.39	.47	.21	.57	(.59)	(.69)	(.35)	1.00

*RC = Role Clarity; WA = Work Assignments; RP = Rules and Procedures; and SUPP = Support.

Key: Convergence Test: Underlined correlations should be greater than .4 (monotrait-heteromethod r > .4).

Discrimination Test: Underlined correlations within a box should be greater than other correlations in the same box. (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Test: Circled correlations should be less than underlined correlations(heterotrait-monomethod r < monotrait-heteromethod r).

of acceptable dimensions narrows to two. Both support and rules and procedures pass. The two other task dimensions have high method variance correlations. This is particularly the case with role clarity. The recommended instrument consists of the 14 items shown in Exhibit C-5. Six items did not pass an item analysis test and were omitted from further examination.

The scoring procedure adopted for the categorical method was based in large measure upon principles of operant conditioning (e.g., Hamner, 1974; Skinner, 1969) and exchange theories (e.g., Emerson, 1972; Homans, 1961; Jacobs, 1971). The present model has proposed that, in any complex organization, environmental conditions and structural conditions vary among subsystems creating specific opportunities and problems which the subsystem is not designed to handle. Leaders are expected to respond to these "gaps" with discretionary leadership to increase performance and member satisfaction. However, external forces may limit the leader's ability to build influence above and beyond that typically required by the position. Hence, not only must the leader perceive and respond to the "need" for discretionary leadership, he/she must also know and respond to those factors which may limit discretionary activity. For example, increasing complexity in the environment, context, and structure of a unit may increase the need for discretionary leadership, but the leader's ability to influence his subordinates may be restricted by the setting (e.g., the subsystem may be in the process of reorganization), the environment (e.g., only limited resources may be available), or the nature of the group (e.g., a cohesive group with an anti-management orientation). Thus, while the existing environmental and structural conditions affect the "need" for discretionary leadership, they

also affect the degree to which the leader can or cannot effectively initiate such leadership activity.

The present model also makes the implicit assumption that increased need for discretionary leadership is directly related to increased opportunities to exercise discretion. Thus, as complexity increases, not only does the need for discretionary leadership increase, but also the "opportunity" for such leadership. In other words, increasing or decreasing complexity serves as a signal or, in operant conditioning terms, a "discriminative stimulus" indicating that discretionary activity can or cannot be implemented.

Given the presence or absence of such a discriminative stimulus, there may or may not be an operant response on the part of the leader. That is, the leader may respond to the stimulus with the necessary activity ("can and does") or he/she may not respond when the need and assumed opportunity persents itself ("could but doesn't"). Similarly, when the discriminative stimulus is absent and no opportunity for discretionary leadership exists, the leader may yield no response ("can't and doesn't") or may initiate activity when it is not needed ("can't but tries anyway"). The matrix of need and opportunity combined with the presence or absence of a response resulted in the four alternatives used in the categorical method.

In addition to the existence of these four alternatives, each was given an arbitrary weight depending upon the nature of the stimulus-response relationship. A condition where the discriminative stimulus is present and the appropriate response follows ("can and does") was viewed as a positive outcome and given a weight of +4. A condition where the stimulus is present and no response occurs ("could but doesn't") was viewed as a negative outcome where opportunities are lost (e.g., Osborn et al., 1980) and given a

weight of -2. A situation where the stimulus is absent (i.e., the appropriate opportunities for discretionary leadership do not exist) and no response is made ("can't and doesn't") was viewed essentially as a neutral outcome. However, in the context of the "favorableness" of an organization's environment, such an outcome is distinctly negative (Osborn et al., 1980). Thus, this category was given a weight of -1. Finally, a situation where the stimulus is absent but an inappropriate response is initiated ("can't but tries anyway") was also viewed as a negative outcome. In fact, given the literature regarding the negative impact of leader activity when it is not warranted by the situation (e.g., House & Mitchell, 1974), this category was considered to represent dysfunctional leadership and given a weight of -3.* This weighted scoring method was used in analysis of the primary survey data and represents the preferred method at the present time.

The "point" method of measuring discretionary leadership, which was used as a validating instrument for the categorical method, was based on a different theoretical approach. While the categorical method emanates from theories of conditioning and exchange, the point system is based on an attribution perspective (e.g., Jones & Davis, 1965; Kelley, 1973). It is postulated that leader behavior that is attributed to role requirements carries less weight and has less influence on employee behavior and attitudes than leader behavior which is attributed more to the leader himself and his discretionary activity. Thus, if the subordinate attributes a larger share of the leader's activity to his/her own volition than to the position and external factors, this should serve as an indicator of discretionary leader-

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*Since the weights assigned were somewhat subjective, alternative scoring systems were investigated such as scoring "can and does" as +1 and all other categories as -1 to represent the distinction between positive and negative outcomes. Comparison of the preferred weighting system with others showed little empirical differences among them with correlation coefficients in the vicinity of .9.

ship. For example, leader consideration that is attributed to be solely a function of external role requirements is unlikely to have a substantial impact on increasing a subordinate's performance or satisfaction. On the other hand, consideration that is attributed to be a function of the leader's desire to help the subordinate close the gap between scarce resources and task difficulty may have greater impact and influence on the subordinate and thereby contribute more toward increasing performance and satisfaction.

In order to validate the categorical method of measuring discretionary leadership, the point method was used not only to provide a validating instrument, but one which was based on an entirely different theoretical orientation as well. Although the sample used for validation in the pilot study was small, we did obtain support for two dimensions using a modified form of the Campbell and Fiske convergent-discriminant validity approach. With these findings, we were prepared to conduct the primary survey of Army telecommunication centers.

Appendix B

Details Concerning the Mail Questionnaire Administration

With written approval of the Seventh Signal Command to send mail questionnaires to selected personnel, it was initially felt that a high return rate would be forthcoming from a pilot sample of Army telecommunications centers (TCC). The actual return rate was about 25 percent. This rate was not judged to be high enough for the major study. It was therefore determined that an unusual effort would be needed to increase the return rate to an acceptable level. This appendix outlines the procedures used in the initial pilot and the revised procedures and concludes with some suggestions for other researchers who wish to achieve high return rates from mail surveys to military units.

The Initial Pilot Study

The procedure used in the initial pilot study was based as much as possible on recommendations made in a mail survey review article by Kanuk and Berenson (1975). Five target TCC units were selected by staff personnel from the Seventh Signal Command. A total of 125 potentially usable operative personnel and shift supervisors were in these five units. Formal cooperation was granted by the Seventh Signal Command and a letter of cooperation was signed by an appropriate official. The letter explained the purpose of the study, showed the support of higher administrators, and encouraged participation. Following recent interpretations of the privacy act and university requirements for subjects involved in social science research, an "informed consent form" was included with the questionnaire.

Instrument

The survey instrument contained all of the scales shown in appendix C with the exception of lateral leadership and measures of specific task environment. In addition, the item format for each scale was approximately the same as it appears in the appendix. The questionnaire was printed on 7 by 8 1/2 inch booklets.

Procedure

Each operator and shift supervisor in the pilot sample was mailed the survey individually. The package they received contained the following: (1) the questionnaire booklet; (2) a cover letter from the Seventh Signal Command endorsing the project and requesting their participation; (3) an informed consent form; (4) an instruction sheet; and (5) a return mail, postage-paid envelope. The instruction sheet informed the participants that they were to complete the questionnaire, sign the consent form, and return both to the researchers using the return envelope. Following the privacy act, respondents were requested to participate and not required to complete the survey.

Three weeks following the mailing of the questionnaire, a reminder letter was mailed to all non-responding participants. If the completed questionnaire had not been received two weeks following that time, another complete set of questionnaire materials was sent. Two weeks later a third follow-up set of materials was sent to the non-respondents. Thus, three follow-up contacts were made 3, 5, and 7 weeks following the initial mailing. Identification of respondents was made through the signature on the consent

form which accompanied the questionnaire. If no consent form was enclosed, the unit of origin was identified using the postmark on the return envelope.

Results

At the time of the first follow-up, only 20 percent of the operator-shift supervisor questionnaires had been received. The second follow-up mailing increased the operator return and shift supervisor return by three percent and the third follow-up increased the rate less than two percent. Thus, the final sample included about 25 percent of the target respondents.

This extremely low return rate was of considerable concern and efforts were made to isolate the key reasons. Conversations with TCC personnel, staff aids at the Seventh Signal Command, and experienced researchers affiliated with the Army Research Institute, in addition to a review of the literature since the 1975 Kanuch and Berenson article, suggested the following:

1. Follow-up procedures could be reinforced by making them closer together and by introducing personal contact.

2. Many potential respondents felt they had to complete the questionnaire on their own personal time. Clarification was sought and authorization was granted to use work time if the sample were more limited.

3. Subjects were urged to complete the questionnaire, but no suspense date or due date was given. It was strongly suggested that such a due date be established for the next administration.

4. Individuals had been asked to return their signed informed consent form with their questionnaire. Several felt their responses could be identified. Therefore, for the next administration, completed questionnaires were to be returned separately from the informed consent forms.

5. OIC's, and their civilian equivalents, did not know if their subordinates had received questionnaires and could not schedule time for completion. While many wanted to assist, they desired some discretion over the timing of the effort. Thus, it was decided to ask commanders to distribute surveys and collect the completed, sealed questionnaires and send them to us directly.

6. The survey appeared longer than necessary. This appeared to be due both to the extra "psychological length" imposed by the booklets which did not allow for as many questions on a page as an 8 1/2 x 11 inch format and to some redundancy in the questions asked. Some redesign of the booklet and study was made to correct these problems while still maintaining adequate cross-checks.

Information provided to potential participants stressed the following points. First, the study was supported by the Seventh Signal Command. Second, participation was voluntary; a blank questionnaire could be returned if the potential participant did not wish his/her superior to know if he/she completed the survey. Third, all responses would be held in confidence if the procedures specified by the researchers were followed. Fourth, the study concerned basic research which could potentially be beneficial to the Army.

Primary Study

In the main study, emphasis was shifted from concentration on operators and supervisors to the responses of shift supervisors, their superiors (NCOIC's),and the superior of their superiors (OIC's). Both military personnel and their civilian equivalents were included. A total of 110 eligible units were identified; however, 29 units were considered inappropriate due to their very small size and the fact that they had no shift supervisors and an additional 6 units were identified as administrative units and were not sampled. There remained a total of 75 units which were contacted. These units

contained 75 OIC's, 49 NCOIC's, and 228 shift supervisors. Support personnel within these units were not sampled.

Instrument

Several versions of the survey instrument were designed for the study. Two versions were designed for the OIC, one for the commander of units which contained an NCOIC and one for the commander of units which contained no NCOIC. The NCOIC received a slightly different form of the survey and the shift supervisors received another version.

These different forms of the survey were as similar as possible; however, instructions and item content varied slightly depending upon the respondent's supervisory level. The version administered to the shift supervisors, along with specific environment and lateral leadership questions asked of OIC's and NCOIC's, are shown in Appendix C.

In an effort to reduce the apparent length of the instrument while maintaining optimum content, the form of the survey was altered in comparison to the pilot study. The scales were arranged so that the questionnaire consisted of 14 pages (each 8 1/2 by 11 inches compared to the pilot of 7 by 8 1/2 inches). The pilot had 18 separate pages. Thus, some actual length reduction and redesign made completion of the questionnaire less burdensome.

Procedure

In addition to altering the instrument and the supervisory level sampled, the procedure for administering the survey was altered. Instead of sending each incumbent the questionnaire directly, a package of materials was delivered to the commanding officer of each unit. Instructions provided with the package

informed the OIC's that they were to distribute the enclosed questionnaires to their subordinates and complete their own questionnaire.

When all questionnaires were completed, the OIC's were to collect the subordinates' surveys, which were sealed and to remain confidential, and mail them directly to the researchers.

Enclosed in the package was a copy of the unit's organizational chart, a return-mail postcard, and enough surveys for all supervisory personnel in the unit. The OIC was instructed to sign and mail the postcard and to review the organization chart and correct it if the unit's personnel status had changed. If more questionnaires were needed, the OIC was to contact the researchers directly. Further, this updated organizational chart was to be returned with the unit's materials.

In summary, the unit's package contained: (1) instructions to the OIC; (2) a return mail postcard; (3) an organizational chart listing the personnel who were to receive the questionnaires; and (4) enough questionnaire packets for each of the unit's subordinate supervisory personnel and the OIC.

The questionnaire packets were labeled according to the incumbent's supervisory level: shift supervisor, NCOIC, or OIC. Enclosed in the packet were the following: (1) the appropriate questionnaire for that level; (2) a cover letter from an appropriate official of the Seventh Signal Command; (3) a letter from the researchers explaining the study and providing detailed instructions; (4) an informed consent form; (5) a postage-paid return

envelope for the informed consent form; and (6) a 7 x 10 inch envelope in which the completed questionnaire was to be placed, sealed, and returned to the OIC.

Instructions provided with the questionnaire indicated that the consent form was to be signed and mailed directly to the researchers in the enclosed envelope. The questionnaire, on the other hand, was to be placed in the 7 x 10 envelope, sealed, and returned along with the other questionnaires to the OIC for delivery to the researchers. These instructions stated explicitly that the respondents' answers to the survey were to remain strictly confidential and were to be used for research purposes only. In addition, the instructions provided a specific due date by which time the questionnaires were to be returned to the researchers.

The return postcard, which was to be mailed by the OIC, gave the researchers information regarding who had received the package and on approximately what date the questionnaires had been distributed to the supervisory personnel. One week following mailing of the initial packages, a reminder postcard was sent to the OIC's of units which had returned the first postcard indicating receipt of the materials. This reminder card thanked the OIC for his/her cooperation and reinforced the due date for the return of the questionnaires. For those units where there was no evidence that materials had been received, efforts were made to contact the OIC by telephone to check on the status of the materials. If none had been received, a new set of materials was mailed. If the materials had been received, the OIC's cooperation was encouraged.

Four weeks following the initial mailing of the questionnaires, a tabulation was made of the response rate. All units which had more than one missing shift supervisor questionnaire were identified, and a letter was sent to the OIC for each unit. This letter encouraged the cooperation of the unit commander in the project and explained the importance of a 100 percent response to the survey. An offer was made to send any additional materials necessary to secure full participation. If no response was made to the first follow-up letter, a second follow-up was made two weeks later. This contact consisted of sending a second letter to the OIC and/or sending a letter and a questionnaire directly to the incumbent.

Response to this second follow-up was closely monitored. If no response was forthcoming, a final contact was made by telephone with selected units which gave a positive response to the previous contacts but whose data had not been received.

In summary, a reminder card was sent to the unit heads one week following the initial mailing. The rate of response for each unit was closely monitored, and a follow-up contact was made with non-responding units four, six, and eight weeks following the initial mailing. Follow-up was conducted by phone and/or by letter with the unit head and/or with the incumbent directly. OIC's were also asked to call the researchers if they had questions. Several did and agreed to participate.

Results

Of the 75 units contacted, all but 2 units yielded some response; however, the amount of data from an additional 5 units was

too small to be considered useful. Therefore, 68 units or 91 percent of the sample responded to the survey in large enough numbers to provide useful information for the unit as a whole. This figure represents 100 percent of the units with no NCOIC and 86 percent of the units which contained an NCOIC. By level, the respondents' returns were: 68 of the OIC's (91 percent), 42 of the NCOIC's (86 percent) and 185 of the shift supervisors (81 percent). Performance data for 13 of the 68 responding units was considered "classified". Therefore, 55 of the units (81 percent) had usable performance data.

On balance, it appears possible to generate a high return rate without using command pressure or requiring individuals to respond. The procedure is more costly and time-consuming than that often followed. But it did yield a very high return rate for the major part of the study.

Appendix C

Questionnaire Measures Used

This appendix contains exhibits pertaining to the questionnaire administered to the shift supervisors unless otherwise indicated. Those for the NCOIC's and OIC's were similar but differed as appropriate to the position.

The exhibits are arranged in the same sequence as the variables are treated elsewhere in the report.

Included with the items is information concerning the way in which the items were combined and scored to make up each scale. When an item was not included in the calculation of a scale it was because that item was tested and found to lower the scale's overall internal consistency reliability. Most of these items were also found to be highly invariant.

Exhibit C-1

General Instructions

This questionnaire contains questions concerning your work and your boss. Please circle or check what YOU feel is the best response.

PLEASE NOTE:

1. Your responses to these statements will remain strictly confidential.
2. There are NO RIGHT OR WRONG ANSWERS to these questions and this is not a test of your ability or consistency in marking answers. Although a number of the items may appear similar to each other, they express distinctions which are important in describing your work situation.
3. Work as rapidly as you can. Your first impressions are usually best in such matters.
4. Please be sure that you MAKE A RESPONSE TO EVERY ITEM. Also, make sure that you mark only one alternative for each statement.
5. Please feel free to express any further opinions you may have regarding your work environment or the questions at the end of the questionnaire.
6. The results of this study will be used FOR RESEARCH PURPOSES ONLY by Professors J. G. Hunt and R. N. Osborn, Southern Illinois University at Carbondale.
7. Your work unit as used in this questionnaire means those subordinates on your shift who report directly to you. Your boss means your immediate supervisor.

THANK YOU.

Exhibit C-2

Specific Environment (Completed by OIC's)

Here we are interested in the units with which your unit deals most frequently. Your unit may interact with a number of others in attempting to accomplish its mission. These can be EITHER INSIDE OR OUTSIDE the 7th Signal Command. Please list below AT LEAST FIVE UNITS which you think are the MOST IMPORTANT to your operations and goal attainment.

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

Approximately how many OTHER units are you in contact with which are not listed above? _____

Of all the units you have contact with, about what percentage are outside of the 7th Signal Command? _____

Exhibit C-2

Specific Environment (Completed by OIC's)

Now please describe both these units you have listed above as well as the other units you interact with. Circle one alternative for each item.

	NO EXTENT	LITTLE EXTENT	SOME EXTENT	GREAT EXTENT	VERY GREAT EXTENT
1. To what extent do the actions of the units affect the operations of your unit?	A	B	C	D	E
2. The action of any one unit may or may not affect the activities of others; to what extent do the actions of the units affect one another?	A	B	C	D	E
3. To what extent must the units support a new project to ensure successful planning and implementation?	A	B	C	D	E
4. To what extent do the units restrict the activities of your unit?	A	B	C	D	E
	0-20%	21-40%	41-60%	61-80%	81-100%
* 5. What percent of the time can you predict the actions of the units?	A	B	C	D	E
* 6. What percent of the time can you predict the expectations of the units?	A	B	C	D	E
* 7. What percent of the time are you certain about how to respond to meet the actions or expectations of the units?	A	B	C	D	E
8. What percent of the time do you receive information too late to capitalize on or offset changes in actions or expectations of the units?	A	B	C	D	E
* 9. What percent of the time can you determine whether a response to the actions or expectations of a unit was effective for the units?	A	B	C	D	E
	NO EXTENT	LITTLE EXTENT	SOME EXTENT	GREAT EXTENT	VERY GREAT EXTENT
10. To what extent have the units been growing (e.g., in terms of budgets, personnel, projects) in the last three years?	A	B	C	D	E
11. To what extent have the units received new sources of support in the last three years?	A	B	C	D	E
12. To what extent are the policies of the units toward your unit favorable?	A	B	C	D	E
13. To what extent are the policies of the units toward your unit consistent over time?	A	B	C	D	E
14. To what extent do the units have slack or reserves in resources?	A	B	C	D	E
15. To what extent are the units powerful?	A	B	C	D	E
16. To what extent are the units able to adapt to change?	A	B	C	D	E

Scale	Calculation of Scale
Interdependence	Σ 1-4
Volatility	Σ 5, 6, 7, 9
Favorability	Σ 10, 11, 13, 14

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

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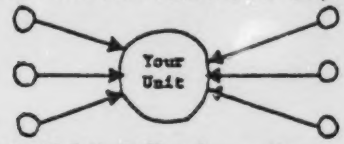
Exhibit C-3

Contextual Variables

- Between-Unit Workflow

The next four questions are about the flow of work between your work unit and others necessary to get that work done. Please circle only one alternative for each case.

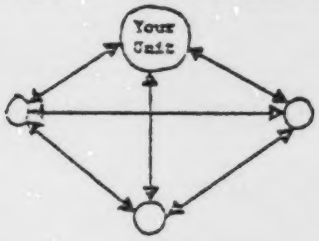
1. Independent Work Flow Case, where your unit receives work from one or a number of different units and sends it on to several others after complete processing.



2. Sequential Work Flow Case, where your unit receives the work from one unit and processes it for another as one unit in a series.

3. Reciprocal Work Flow Case, where your unit is in direct contact with one or another in a back-and-forth manner over a period of time.

4. Team Work Flow Case, where your unit collaborates with others to diagnose problems and solve them.



ALMOST NONE A	LITTLE B	ABOUT 50% C	A LOT D	ALMOST ALL E
ALMOST NONE A	LITTLE B	ABOUT 50% C	A LOT D	ALMOST ALL E
ALMOST NONE A	LITTLE B	ABOUT 50% C	A LOT D	ALMOST ALL E
ALMOST NONE A	LITTLE B	ABOUT 50% C	A LOT D	ALMOST ALL E

Scale

Between-Unit Workflow

Calculation of Scale

SCORE = (Item 1x0) + (Item 2x0.33) +(Item 3x0.66) + Item 4, A=1 to E=5.

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■ Task Specialization		0-20%	21-40%	41-60%	61-80%	81-100%
* 1.	What percent of the employees in your work unit perform the same job?...	A	B	C	D	E
* 2.	What percent of the employees in your work unit make decisions of the same type?.....	A	B	C	D	E
3.	What percent of the employees in your work unit have more than one job to perform?.....	A	B	C	D	E

Scale	Calculation of Scale
Task Specialization	Σ 1, 2, 3

Scoring: A=1 to E=5 except for items with asterisk (*) which are reversed scored.

Exhibit C-4

Structural Variables

- Formalization

The following questions consider whether documents are available irrespective of whether they are actually used. A document is at a minimum a single piece of paper with printed, typed, or otherwise reproduced content--not handwritten.

1. Who is given a copy of the organization chart? (Check one)

___ A. No one
___ B. The commander/director only
___ C. The commander/director plus the NCOIC (if any)
___ D. The commander/director, NCOIC (if any), plus shift supervisors
___ E. All employees in the TCC

2. What percentage of non-supervisory employees are given written operating instructions? (Check one)

___ A. 0-20% ___ B. 21-40% ___ C. 41-60% ___ D. 61-80% ___ E. 81-100%

Are written terms of reference or job descriptions given to the following?

3. The commander/director ___Yes ___No

4. Supervisory employees ___Yes ___No

5. Non-supervisory employees ___Yes ___No

6. Is a manual of rules and regulations available? ___Yes ___No

7. Is a written statement of policies available? ___Yes ___No

8. Is a written work-flow schedule available? ___Yes ___No

9. What percentage of nonsupervisory employees turn in a written report on a regular basis? (Check one)

___ A. 0-20% ___ B. 21-40% ___ C. 41-60% ___ D. 61-80% ___ E. 81-100%

Scale	Calculation of Scale
Formalization (Standardized Variables)	Σ 1 to 9

Scoring: A=1 to E=5, No=1, Yes=2 all items standardized before summation.

Decentralization

Here we would like to ask you to answer in terms of typical work units within a TCC, not necessarily your own. Please circle one alternative for each of the following statements:

1. How much influence does the typical supervisor at your boss' level have over...?

	NONE	LITTLE	SOME	QUITE A BIT	VERY MUCH	DON'T KNOW
a. establishing a budget for the unit	A	B	C	D	E	X
b. hiring and firing personnel	A	B	C	D	E	X
c. promoting and demoting personnel	A	B	C	D	E	X
d. establishing a new project or program	A	B	C	D	E	X
e. setting work quotas	A	B	C	D	E	X
f. establishing rules and procedures	A	B	C	D	E	X
g. determining how work exceptions are to be handled.	A	B	C	D	E	X
h. purchase of supplies and equipment	A	B	C	D	E	X

	0-20%	21-40%	41-60%	61-80%	81-100%
2. Approximately what percent of the budget for a typical unit is directly under the boss' control?	A	B	C	D	E
3. Approximately how large a percent of a subordinate's merit raise is under control of the typical boss?	A	B	C	D	E
4. Where the typical boss does not have the formal authority to make a decision, what percent of the time is his immediate supervisor authorized to make decisions (rather than being required to refer them to a higher level)?	A	B	C	D	E
5. Approximately what percent of the time are promotion recommendations of a typical boss accepted?	A	B	C	D	E

6. If you were to describe a typical work unit within a TCC to an outsider, would you call it: (Check one)

___ A. Very centralized
___ B. Somewhat centralized
___ C. About as centralized as decentralized
___ D. Somewhat decentralized
___ E. Very decentralized

Scale	Calculation of Scale
Decentralization	Σ 1a-1n, 2, 3, 4, 5

Scoring: A=1 to E=5, X scored as missing data.

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▲ Within-Unit Workflow

The next four questions are about the internal flow of work between the employees in your work unit. Listed and diagrammed below are four common ways that the work performed in your unit can flow between the employees. (Your boss should be considered OUTSIDE the boxes below.)

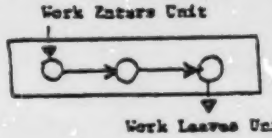
Please indicate to the right of each case how much of the normal work in your unit flows between the employees in the manner described. Please circle only <u>one</u> alternative for each case.

ALMOST NONE	LITTLE	ABOUT 50%	A LOT	ALMOST ALL
A	B	C	D	E

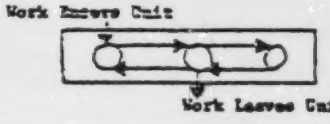
1. <u>Independent Work Flow Case</u>, where work and activities are performed by employees separately.

ALMOST NONE	LITTLE	ABOUT 50%	A LOT	ALMOST ALL
A	B	C	D	E

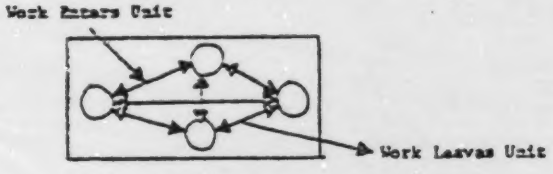
2. <u>Sequential Work Flow Case</u>, where work and activities flow between employees, but most in only one direction.



ALMOST NONE	LITTLE	ABOUT 50%	A LOT	ALMOST ALL
A	B	C	D	E

3. <u>Reciprocal Work Flow Case</u>, where work and activities flow between employees in a back-and-forth manner <u>over a period of time</u>.

ALMOST NONE	LITTLE	ABOUT 50%	A LOT	ALMOST ALL
A	B	C	D	E

4. <u>Team Work Flow Case</u>, where work and activities come into your unit and employees diagnose, problem solve, and collaborate as a group <u>at the same time</u> in meetings to deal with the work.



<u>Scale</u>

Within-Unit Workflow

<u>Calculation of Scale</u>

Score = (Item 1x0) + (Item 2x 0.33) + (Item 3x0.66) + Item 4; A=1 to E=5.

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▼Task Standardization

1. How many written rules and procedures exist for doing your major tasks? (Check one)

___ A. Very few
___ B. A small number
___ C. A moderate number
___ D. A large number
___ E. A great number

2. How precisely do these rules and procedures specify how your major tasks are done? (Check one)

___ A. Very general
___ B. Mostly general
___ C. Somewhat specific
___ D. Quite specific
___ E. Very specific

3. To what extent did you follow standard procedures or practices to do your major tasks in the last three months? (Check one)

___ A. To no extent
___ B. Little extent
___ C. Some extent
___ D. Great extent
___ E. Very great extent

Please circle one of the following alternatives for each statement below.

	0-20%	21-40%	41-60%	61-80%	81-100%
4. When considering the various situations that arise in performing your work what percent of the time do you have written or unwritten procedures for dealing with them?	A	B	C	D	E

Scale	Calculation of Scale
Task Standardization	Σ 1, 2, 3, 4

Scoring: A=1 to E=5.

Exhibit C-5

Leadership

- Discretionary Leadership (Categorical)

Here we are interested in how your boss behaves toward you on the job. For each of the items below, circle the one alternative that you feel is most appropriate.

MY BOSS...	CAN AND DOES	COULD BUT DOESN'T	CAN'T BUT TRIES ANYWAY	CAN'T AND DOESN'T
1. Explains the level of performance that is expected of me....	A	B	C	D
2. Helps make working on my job more pleasant.....	A	B	C	D
3. Tells me how I am to go about my job.....	A	B	C	D
4. Puts me on specific jobs.....	A	B	C	D
5. Considers my feelings.....	A	B	C	D
6. Explains the quality of work that is expected of me.....	A	B	C	D
7. Emphasizes rules and regulations which affect how I do my job.....	A	B	C	D
8. Decides how I am to do my job.....	A	B	C	D
9. Gives specific explanations of what is expected of me on my job.....	A	B	C	D
10. Carefully defines what jobs I am to do.....	A	B	C	D
11. Gives me specific work assignments.....	A	B	C	D
12. Explains what is expected of me on my job.....	A	B	C	D
13. Maintains a friendly working relationship with me.....	A	B	C	D
14. Gives me instructions on how to do my job.....	A	B	C	D

Scale	Calculation of Scale
Discretionary Leadership Role Clarity	Σ 1, 6, 9, 12
Discretionary Leadership Work Assignment	Σ 4, 10, 11
Discretionary Leadership Rules and Procedures	Σ 3, 7, 8, 14
Discretionary Leadership Support	Σ 2, 5, 13

Scoring: 'Can and Does' = +4, 'Could but Doesn't' = -2, 'Can't but Tries Anyway' = -3, 'Can't and Doesn't' = -1.

- Discretionary Leadership (Points)

Think of your boss' leader behavior as being controlled by himself and by a combination of outside factors. The outside factors include: UPPER LEVEL DIRECTIVES, OTHER SUPERVISORS AT HIS LEVEL, WRITTEN POLICIES, JOB REQUIREMENTS, OTHERS IN YOUR WORK UNIT, YOU, plus FACTORS OUTSIDE THE TCC.

For each of the four behaviors below, allocate 100 points between your boss' control and the control by outside factors. For example, if you gave your boss 30 points that would mean the remaining 70 points would go to outside factors.

1. Clarifying what is expected of me in my work: _____ points for boss

2. Assigning me to specific work tasks: _____ points for boss

3. Specifying rules, procedures, and policies for me to use or follow in executing my job: _____ points for boss

4. Maintaining a pleasant and friendly working relationship with me: _____ points for boss

Scale		Calculation of Scale
Discretionary Points:	Role Clarity	1
Discretionary Points:	Work Assignments	2
Discretionary Points:	Rules and Procedures	3
Discretionary Points:	Support	4

■ Leader Behavior

Please circle one alternative for each of the following statements:

MY BOSS...	STRONGLY DISAGREE	DIS-AGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
*1. Gives vague explanations of what is expected of me.....	A	B	C	D	E
2. Helps make working on my job more pleasant.....	A	B	C	D	E
3. Tells me how to go about doing my job.....	A	B	C	D	E
4. Puts me on specific jobs.....	A	B	C	D	E
*5. Gives me unclear goals to reach on my job.....	A	B	C	D	E
6. Maintains a friendly working relationship with me.....	A	B	C	D	E
*7. Permits me to ignore rules and regulations which affect how I do my job.....	A	B	C	D	E
*8. Gives me broad assignments.....	A	B	C	D	E
9. Explains the level of performance that is expected of me.	A	B	C	D	E
10. Looks out for my personal welfare.....	A	B	C	D	E
*11. Lets me develop my own methods for doing my job.....	A	B	C	D	E
12. Carefully defines what jobs I am to do.....	A	B	C	D	E
13. Explains the quality of work that is expected of me.....	A	B	C	D	E
*14. Does things to make my job less pleasant.....	A	B	C	D	E
15. Gives me instructions on how to do my job.....	A	B	C	D	E
16. Gives me specific work assignments.....	A	B	C	D	E
17. Explains what is expected of me on my job.....	A	B	C	D	E
*18. Treats me without considering my feelings.....	A	B	C	D	E
19. Decides how I am to do my job.....	A	B	C	D	E
*20. Lets me decide what specific duties to perform.....	A	B	C	D	E

Scale	Calculation of Scale
Leader Behavior: Role Clarity	Σ 1, 5, 9, 13, 17
Leader Behavior: Work Assignments	Σ 4, 8, 12, 16, 20
Leader Behavior: Rules and Procedures	Σ 3, 7, 11, 15, 19
Leader Behavior: Support	Σ 2, 6, 10, 14, 18

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

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▲Required Leadership

Some leaders are required to do more than others. These requirements may stem from UPPER LEVEL DIRECTIVES, OTHER SUPERVISORS AT HIS LEVEL, WRITTEN POLICIES, JOB REQUIREMENTS, OTHERS IN YOUR WORK UNIT, YOU, FACTORS OUTSIDE THE TCC, etc. How many requirements does your boss have to do each of the following?

	FEW REQUIREMENTS				MANY REQUIREMENTS
1. Maintain a pleasant and friendly working relationship....	A	B	C	D	E
2. Assign specific work tasks.....	A	B	C	D	E
3. Specify rules, procedures, and policies to use in executing jobs.....	A	B	C	D	E
4. Clarify what is expected in one's work.....	A	B	C	D	E

Scale	Calculation of Scale
Required Role Clarity	4
Required Work Assignment	2
Required Rules and Procedures	3
Required Support	1

Scoring: A=1 to E=5.

Lateral Leadership (Completed by OIC's)

The items below are concerned with HOW A LEADER IN YOUR POSITION should interact with the units you just described above. From your work experience and viewpoint, answer each of the following questions as if you were recommending a general policy for leaders in your position.

		ALWAYS	OFTEN	OCCASIONALLY	SELDOM	NEVER
*1.	He (the leader) should initiate contact with other units as opposed to waiting for their unit personnel to come to him.....	A	B	C	D	E
*2.	He should express his approval or disapproval of other units by complimenting achievements and pointing out shortcomings.....	A	B	C	D	E
*3.	Where he thinks that close contact with other units is necessary, he should develop the contact himself as opposed to having others develop the contact.....	A	B	C	D	E
4.	He should stress building the image of his unit in his relationship with other units as opposed to letting the actions of his unit speak for themselves.....	A	B	C	D	E
*5.	When the interests of other units conflict with those of his own unit, he should make immediate adjustments to these pressures.....	A	B	C	D	E
*6.	He should exert pressure on other units to obtain closer enforcement of policies, procedures, and rules concerning existing projects.....	A	B	C	D	E
*7.	He should exert pressure on other units to exceed existing performance standards or plans (as opposed to accepting performance which is just up to existing standards or plans).....	A	B	C	D	E
*8.	He should exert pressure on other units to develop a series of evaluation criteria for existing programs and projects.....	A	B	C	D	E
9.	He should try to discourage open discussion of issues and problems with other units.....	A	B	C	D	E
10.	He should try to persuade the leaders of other units to agree to broadly stated policies and procedures on common projects (as opposed to detailed instructions that clarify exactly what each unit is expected to do).	A	B	C	D	E
*11.	When the overall interests of the organization come into direct conflict with those in his own unit, he should make immediate adjustment to these pressures..	A	B	C	D	E
*12.	He should place roughly equal responsibility on all the units participating in a given project rather than on one or more of the main contributors.....	A	B	C	D	E
13.	When developing new programs or projects, he should rely principally upon his own judgment rather than the judgment of other units.....	A	B	C	D	E
14.	In operating existing programs or projects, he should rely principally upon his own judgment rather than the judgment of other units.....	A	B	C	D	E
15.	He should maintain tight control over his unit's resources.....	A	B	C	D	E
*16.	He should spend time obtaining information from other units which provide services to his unit.....	A	B	C	D	E
*17.	He should concentrate on serving a relatively few units which need services that help develop his people or lead to extra "know-how" (as opposed to providing routine services to many units).....	A	B	C	D	E

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		ALWAYS	OFTEN	OCCASIONALLY	SELDOM	NEVER
* 18.	He should spend time maintaining contacts with widely dispersed units that might someday need his unit's services.....	A	B	C	D	E
* 19.	When his unit's advice is not accepted by the head of another unit he should not stop but try to "sell" the advice to others in that unit.....	A	B	C	D	E
20.	He should encourage his subordinates to offer advice to other units beyond that which the other units ask for.....	A	B	C	D	E
21.	He should be concerned that his unit, rather than the unit that it has helped, receive credit for resulting improvements.....	A	B	C	D	E
* 22.	He should encourage his subordinates to assist other units by helping their people to understand their problems and developing skills in taking action.....	A	B	C	D	E
* 23.	He should provide opportunities for other units to call for help from his unit.....	A	B	C	D	E
* 24.	In dealing with units which routinely check or audit the performance of his unit he should initiate and maintain contact with the checking units.....	A	B	C	D	E
25.	He should encourage the separateness and independence of his unit (as opposed to encouraging interaction with other units).....	A	B	C	D	E
26.	He should emphasize the authority of his position when dealing with other units.....	A	B	C	D	E
		0-20%	21-40%	41-60%	61-80%	81-100%
27.	What percent of time should he spend in interacting with other units (as opposed to spending time administering his own unit)?.....	A	B	C	D	E

PLEASE NOTE: The following three questions concern only those units which are MOST IMPORTANT to your operation.

		ALWAYS	OFTEN	OCCASIONALLY	SELDOM	NEVER
28.	When the overall interests of the organization come into direct conflict with those of the "important units" he should support the organization.....	A	B	C	D	E
*29.	He should allocate considerable time to developing a very close working relationship with the "important units" (as opposed to allocating time to developing subordinate relationships in his own unit).....	A	B	C	D	E
*30.	He should attempt to form coalitions with the "important units" (as opposed to working with each separately).....	A	B	C	D	E

Scale	Calculation of Scale
Pressure for Action	Σ 1, 2, 6, 7, 8, 16, 24
Network Development	Σ 12, 13, 14, 18, 19, 27, 28
Adaptation to Pressure	Σ 5, 9, 11, 22, 23

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

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Exhibit C-6

Group and Task Variables

- Group Cohesiveness

1) Here we want you to describe your shift as a whole. Below are pairs of adjectives. Please place one check-mark on each scale according to which pole best describes your shift as a whole. Note, make only one check-mark for each pair of adjectives. For example, if you think your subordinates are slightly handsome, you would check:

	EXTREMELY	QUITE	SLIGHTLY	NEITHER ONE NOR THE OTHER	SLIGHTLY	QUITE	EXTREMELY	
Handsome	:	:	: X :	:	:	:	:	Ugly

PLEASE MARK ONLY ONE X FOR EACH SCALE.

		EXTREMELY	QUITE	SLIGHTLY	NEITHER ONE NOR THE OTHER	SLIGHTLY	QUITE	EXTREMELY	
		1	2	3	4	5	6	7	
* 1.	Cooperative	:	:	:	:	:	:	:	Uncooperative
* 2.	Pleasant	:	:	:	:	:	:	:	Unpleasant
3.	Quarrelsome	:	:	:	:	:	:	:	Congenial
4.	Selfish	:	:	:	:	:	:	:	Unselfish
5.	Belligerent	:	:	:	:	:	:	:	Peaceful
* 6.	Vigorous	:	:	:	:	:	:	:	Feeble
* 7.	Efficient	:	:	:	:	:	:	:	Inefficient
* 8.	Wise	:	:	:	:	:	:	:	Foolish
9.	Obstructive	:	:	:	:	:	:	:	Helpful

Scale	Calculation of Scale
Group Cohesiveness	Σ 1 to 9

Scoring: Items scored for 1 to 7 except for items with asterisk (*) which are reversed scored.

■ Task Difficulty

* 5. To what extent is there a CLEARLY KNOWN WAY to do the major types of work you NORMALLY ENCOUNTER?

No Extent	Little Extent	Some Extent	Great Extent	Very Great Extent
A	B	C	D	E

* 6. HOW EASY is it for YOU to KNOW whether you do your work correctly?

Very Difficult	Quite Difficult	Somewhat Easy	Quite Easy	Very Easy
A	B	C	D	E

* 7. WHAT PERCENT OF THE TIME are you GENERALLY SURE OF WHAT the OUTCOME of your work efforts will be?

40% or Less	41-60%	61-75%	76-90%	91% or More
A	B	C	D	E

8. In the past 3 months, HOW OFTEN did DIFFICULT PROBLEMS ARISE in your work for which there were no immediate or apparent solutions?

Once a Week or Less	About 2-4 Times a Week	About Once a Day	About 2-4 Times a Day	5 or More Times a Day
A	B	C	D	E

9. About HOW MUCH TIME did you spend solving these WORK PROBLEMS?

Less than 1 hr/Week	About 1-4 hours/Week	About 1 hour/Day	About 2-3 hours/Day	4 or More hours/Day
A	B	C	D	E

*10. How OFTEN can you solve these types of specific work problems BY GOING TO SOMEONE in this organization for an ANSWER?

Very Seldom	Sometimes	About Half the Time	Quite Often	Most of the Time
A	B	C	D	E

Scale	Calculation of Scale
Task Difficulty	Σ 5, 6, 7, 8, 9, 10

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

▲Task Variability

Circle one alternative for each statement.

1. To what extent do you perform the SAME TASKS from day-to-day?

Almost All My Tasks are the Same Day-to-Day	Many of My Tasks are the Same Day-to-Day	About Half My Tasks are the Same Day-to-Day	Some of My Tasks are the Same Day-to-Day	Almost No Tasks are the Same Day-to-Day
A	B	C	D	E

2. How much the SAME are the day-to-day situations, problems, or issues you encounter in performing your major tasks?

Very much the Same	Mostly the Same	Quite a Bit Different	Very Much Different	Completely Different
A	B	C	D	E

3. During a normal week, HOW FREQUENTLY do EXCEPTIONS ARISE in your work which require SUBSTANTIALLY DIFFERENT methods or procedures for doing it?

Very Rarely	Occasionally	Quite Often	Very Often	Constantly
A	B	C	D	E

* 4. HOW OFTEN do you FOLLOW about the SAME WORK METHODS OR STEPS for DOING your major tasks from day-to-day?

Very Seldom	Sometimes	About Half the Time	Quite Often	Very Often
A	B	C	D	E

Scale	Calculation of Scale
Task Variability	Σ 1, 2, 3, 4

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

▼ Expertise

PLEASE COMPLETE THE FOLLOWING INFORMATION.

1. Are you Civil Service? ___ Army? ___
2. Your AGE? _____
3. About how many people work in your unit? _____
4. Your SEX? _____
5. Years of EDUCATION? _____
6. Years of SERVICE (Army or Civil Service)? _____
7. Your RANK or GS RATING? _____
8. SHIFT? _____
9. Do you have any comments? If so, please state them here.

Scale	Calculation of Scale
Expertise	Σ 1, 2, 6

Scoring: Item 1 scored as percent civilian. Items 1, 2, and 6 standardized before summation.

Exhibit C-7

Employee Maintenance Criteria

- Job Descriptive Index

For each item under each scale (Work, Pay, etc.) please put one of the following alternatives in the space to the left of EACH ITEM:

If the item APPLIES..... Mark Y (for yes)
If the item DOES NOT APPLY... Mark N (for no)
If you CANNOT DECIDE..... Mark ? (for don't know)

PLEASE RESPOND TO EVERY ITEM.

MY WORK

* ___ Fascinating
___ Routine
* ___ Satisfying
___ Boring
* ___ Good
* ___ Creative
* ___ Respected
___ Hot
* ___ Pleasant
* ___ Useful
___ Tiresome
* ___ Healthful
* ___ Challenging
___ On your feet
___ Frustrating
___ Simple
___ Endless
* ___ Gives sense of accomplishment

MY BOSS

* ___ Asks my advice
___ Hard to please
___ Impolite
* ___ Praises good work
* ___ Tactful
* ___ Influential
* ___ Up-to-date
___ Doesn't supervise enough
___ Quick-tempered
* ___ Tells me where I stand
___ Annoying
___ Stubborn
* ___ Knows job well
___ Bad
* ___ Intelligent
* ___ Leaves me on my own
* ___ Around when needed
___ Lazy

MY CO-WORKERS

* ___ Stimulating
___ Boring
___ Slow
* ___ Ambitious
___ Stupid
* ___ Responsible
* ___ Fast
* ___ Intelligent
___ Easy to make enemies
___ Talks too much
* ___ Smart
___ Lazy
___ Unpleasant
___ No privacy
* ___ Active
___ Narrow interests
* ___ Loyal
___ Hard to meet

MY PAY

* ___ Income adequate for normal expenses
* ___ Satisfactory profit sharing
___ Barely live on income
___ Bad
* ___ Income provides luxuries
___ Insecure
___ Less than I desire
* ___ Highly paid
___ Underpaid

MY PROMOTIONS

* ___ Good opportunity for advancement
___ Opportunity somewhat limited
* ___ Promotion on ability
___ Dead-end job
* ___ Good chance for promotion
___ Unfair promotion policy
___ Infrequent promotions
* ___ Regular promotions
* ___ Fairly good chance for promotion

Scale	Calculation of Scale
JDI Work	Σ of work items
JDI Supervision	Σ of boss items
JDI Co-Workers	Σ of co-worker items
JDI Pay	(Σ of pay items) X 2
JDI Promotions	(Σ of promotion items) X 2

Scoring: If starred, Yes=3, No=0. If non-starred, No=3, Yes=0.

- Job in General Satisfaction

Please put a check-mark under the face that expresses how you feel about your job in general, including the work, the pay, the supervision, the opportunities for promotion and the people you work with.

Score = ☐ ☐ ☐ ☐ ☐ ☐
6 5 4 3 2 1

▲Job Involvement

Please respond by circling one alternative for each of the following statements:

		STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
*1.	The major satisfaction in my life comes from my work.....	A	B	C	D
*2.	The most important things that happen to me involve my work.....	A	B	C	D
*3.	I'm really a perfectionist about my work.....	A	B	C	D
*4.	I live, eat, and breathe my job.....	A	B	C	D
*5.	I am very much involved personally in my work.....	A	B	C	D
6.	Most things in life are more important than my work.....	A	B	C	D

Scale	Calculation of Scale
Job Involvement	Σ 1, 2, 3, 4, 5, 6

Scoring: A=1 to D=4 except for items with asterisk (*) which are reverse scored.

Intent to Leave

Check one alternative for each of the following statements.

1. Which of the following statements most clearly reflects your feelings about your future in the Army (Civil Service) within the next year?

___ A. Definitely will not leave
___ B. Probably will not leave
___ C. Uncertain
___ D. Probably will leave
___ E. Definitely will leave

*2. Are you presently considering leaving the Army (Civil Service)? How do you feel about this?

___ A. I am presently looking and planning to leave
___ B. I am seriously considering leaving in the near future
___ C. I have no feelings about this one way or the other
___ D. As far as I can see ahead, I intend to stay in the Army (Civil Service)
___ E. It is very unlikely that I would ever consider leaving the Army (Civil Service)

3. If you were completely free to choose, would you prefer to continue working in the Army (Civil Service) or would you prefer not to?

___ A. Prefer very much to continue working for the Army (Civil Service)
___ B. Prefer to work here
___ C. Don't care either way
___ D. Prefer not to work here
___ E. Prefer very much not to continue working for the Army (Civil Service)

4. Which best describes your Army (Civil Service) career plans?

___ A. Definitely intend a career
___ B. Most likely will make it a career
___ C. Even chance
___ D. Most likely will not make it a career
___ E. Definitely do not intend a career

5. How important is it to you personally to spend your career in the Army (Civil Service) rather than with some other organization?

___ A. It is very important for me to spend my career in the Army (Civil Service)
___ B. Fairly important
___ C. Of some importance
___ D. Of no importance at all
___ E. I have no feelings about this one way or the other

6. (ARMY ONLY) After you finish your present tour of Active Duty, do you intend to sign up for additional Active Military Service?

___ A. Yes, I am on indefinite tour now, and intend to remain on Active Duty until retired or involuntarily retired?
___ B. Yes, I am on an obligated tour and I intend to remain on Active Duty
___ C. I am undecided
___ D. No, I intend to leave Active Duty at the end of my obligated tour
___ E. No, I intend to resign my commission in the near future

*7. (ARMY ONLY) Do you plan to re-enlist or continue your commission?

___ A. No, I plan to retire
___ B. No, I plan to separate without retirement benefits
___ C. Uncertain, probably no
___ D. Uncertain, probably yes
___ E. Yes

Scale	Calculation of Scale
Intent to Leave Army	$(\Sigma 1\text{-}7)/7$
Intent to Leave Civil Service	$(\Sigma 1\text{-}5)/5$

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

System Rewards

Please circle one alternative for each of the following statements:

	STRONGLY DISAGREE	DIS-AGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
* 1. People who continually screw up around here get the same treatment as good performers.....	A	B	C	D	E
2. Merit is import here, if you do a good job the Army appreciates it.....	A	B	C	D	E
3. Rewards here are given to those who deserve them.....	A	B	C	D	E

Scale	Calculation of Scale
System Rewards	Σ 1, 2, 3

Scoring: A=1 to E=5 except for items with asterisk (*) which are reverse scored.

▼ Goal Congruence

Please circle one alternative for each of the following statements depending upon how YOU feel about each item.

		STRONGLY DISAGREE	DIS-AGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	DON'T KNOW
1.	The direction in which the Army leadership is moving the Army is appropriate.....	A	B	C	D	E	X
2.	The direction in which my boss is moving my work unit is appropriate.....	A	B	C	D	E	X
3.	The goal priorities of the Army leadership for the Army are appropriate.....	A	B	C	D	E	X
4.	The goals of my work unit are in the right direction.....	A	B	C	D	E	X
* 5.	The goals of the TCC's are headed the wrong way..	A	B	C	D	E	X
6.	My feeling about the goals assigned to my work unit is that I.....	A	B	C	D	E	X
7.	The goals of the Army and those of my work unit are headed in the same direction.....	A	B	C	D	E	X
* 8.	The goals of my work unit are screwed up.....	A	B	C	D	E	X
9.	My feeling about the Army's goals is that I.....	A	B	C	D	E	X
10.	The goal priorities of my boss for my work unit are appropriate.....	A	B	C	D	E	X

Scale	Calculation of Scale
Unit Goal Congruence	Σ 2, 4, 6, 8, 10
System Goal Congruence	Σ 1, 3, 5, 7, 9

Scoring: A=1 to E=5, except for items with asterisk (*) which are reverse scored. X scored as missing data.

Appendix D

Supplementary Tables and Analyses

This appendix includes exhibits dealing with the following:

1. Descriptive statistics (Exhibit D1)

2. Intercorrelations for environmental, contextual, structural, and group and task variables (Exhibits D-2 through D-6)

3. Intercorrelations for leadership variables (Exhibits D-7 through D-11)

4. Correlations between macro and group and task variables and leadership (Exhibit D-12)

5. Intercorrelations and correlations for criteria variables (Exhibits D-13 through D-16)

6. Correlations between environment, context, structure, group and task variables and leadership and the criteria (Exhibits D-17 through D-24)

7. Convergent and discriminant summary for discretionary leadership (Exhibits D-25 and D-26)

8. Factor analysis summary for lateral leadership (Exhibit D-27)

Exhibit D-1

Descriptive Statistics for Present Sample

Variable	Descriptive Statistics				
	Mean	Median	SD	Skewness	Reliability[a]
General Environment[b]					
Interdependence	-0.00	-0.38	3.08	1.69	0.77
Volatility	-0.08	-0.68	2.66	1.88	0.63
Favorability	0.18	0.62	2.96	-0.59	0.72
Complexity	6.00	-0.94	30.57	2.70	-
Specific Environment					
Interdependence	13.69	13.79	2.59	-0.40	0.56
Volatility	10.03	9.00	3.79	1.14	0.86
Favorability	12.12	11.77	2.65	0.63	0.61
Complexity	1672.90	1513.00	915.13	2.88	-
Context					
Log of Size	1.15	1.14	0.23	-0.18	-
Between-Unit Workflow	5.40	5.30	1.19	0.54	-
Task Specialization	10.37	10.18	2.03	-0.25	0.65
Complexity	65.14	56.52	26.25	1.19	-
Structure					
Formalization	0.05	0.75	2.70	-1.11	0.72
Decentralization	34.49	35.78	8.24	0.06	0.84
Within-Unit Workflow	5.32	5.08	1.28	0.35	-
Standardization	12.92	13.03	2.76	-0.12	0.76
Complexity	876.23	1203.20	6843.80	0.22	-

Exhibit D-1--Continued

Variable	Descriptive Statistics				
	Mean	Median	SD	Skewness	Reliability[a]
Group and Task					
Cohesiveness	48.34	48.67	4.92	-0.34	0.83
Task Difficulty	11.13	10.67	2.69	0.80	0.64
Task Variability	7.94	7.70	2.13	1.60	0.74
Expertise Index	0.00	0.62	2.79	-0.60	0.92
Discretionary Leadership					
Role Clarity	5.23	5.09	7.36	-0.23	0.88
Work Assignments	2.13	1.99	5.12	0.16	0.74
Rules and Procedures	1.74	3.00	6.18	0.07	0.76
Support	5.17	4.57	5.87	-0.46	0.80
Leader Behavior					
Role Clarity	17.32	17.36	2.69	-0.40	0.82
Work Assignments	14.84	15.00	1.80	-1.08	0.55
Rules and Procedures	15.42	15.35	2.02	0.52	0.58
Support	17.22	17.29	3.21	-0.75	0.86
Required Leadership					
Role Clarity	3.26	3.32	1.04	-0.15	-
Work Assignments	2.68	2.68	0.87	0.20	-
Rules and Procedures	3.56	3.51	0.88	-0.16	-
Support	3.01	2.99	0.80	0.16	-
Lateral Leadership					
Pressure for Action	26.02	26.69	4.73	-0.87	0.79
Network Development	19.97	19.45	4.60	-0.14	0.72
Adaptation to Pressure	20.34	20.86	3.02	-0.60	0.66

Exhibit D-1--Continued

	Descriptive Statistics				
	Mean	Median	SD	Skewness	Reliability[a]
Performance					
Log of Error Rate	-0.26	-0.28	0.34	0.08	-
Log of Down Time	0.21	0.24	0.46	-1.25	-
Log of Variability in Error Rate	-0.65	-0.66	0.41	0.19	-
Log of Variability in Down Time	0.06	0.02	0.46	0.34	-
Employee Maintenance					
JDI Work	32.07	32.69	8.57	-0.79	0.82
JDI Supervision	38.27	40.48	10.59	-0.89	0.88
JDI Co-Workers	41.70	41.04	8.38	-1.02	0.87
JDI Pay	18.97	18.08	8.66	0.27	0.78
JDI Promotion	12.80	10.76	10.09	1.46	0.85
JDI Total Score	143.63	144.00	28.10	-0.69	0.91
Job in General Satisfaction	3.60	3.68	0.81	-0.32	-
Job Involvement	14.88	14.99	1.94	-0.25	0.64
Intent to Leave	2.12	2.00	0.68	0.77	0.78
Systems Rewards	7.77	7.70	2.01	-0.01	0.79
Unit Goal Congruence	17.31	17.02	2.64	-0.21	0.83
System Goal Congruence	15.39	15.02	2.68	0.12	0.75

Supplementary Statistics for Variables Making Up General Environment Components

Interdependence[c]					
Legal Political-1977 Per Capita State Expenditures	911.21	822.27	407.68	1.68	-
Socio cultural-1977 Population Density per square mile	1144.32	129.08	3192.92	2.95	-
Economic-1977 Manufacturing concentration index	2.48	2.38	0.68	-0.13	-
Education-1976 Physicians per 100,000 residents	197.56	162.00	128.60	2.59	-

Exhibit D-1--Continued

	Descriptive Statistics				
	Mean	Median	SD	Skewness	Reliability[a]
Volatility[c]					
Legal Political-1968 Change in Political Party	0.07	0.03	0.08	2.24	-
Socio cultural-Change in percent black 1960 to 1970	1.14	0.15	5.43	2.21	-
Economic-change in percent per capita income 1970 to 1977	1.86	1.87	0.10	0.66	-
Education-Change in percent literate 1960 to 1970	2.00	2.00	0.30	-0.12	-
Favorability[c]					
Legal Political-1977 total state expenditures	5,987,844,000	3,443,973,000	6,559,585,000	1.74	-
Socio cultural-1970 life expectancy (years)	70.38	70.22	1.30	-0.04	-
Economic-1977 per capita income	7054.81	6867.25	1074.96	0.68	-
Education-1970 percent literate	98.53	98.64	0.63	-1.05	-

[a]Cronbach's alpha for an aggregated sample size of from 61 to 68 units for all variables except those which are underlined. Underlined values were based upon a Spearman-Brown split-half reliability figure for non-aggregated shift supervisor data only (n=185). This procedure was used because the referent for the NCOIC items was different from the shift supervisor referent or because, in some cases, the design of the instrument called for matching of items for split-half reliability.

[b]Specific variables making up these components are shown as a supplement to this exhibit.

[c]Interdependence, Volatility, and Favorability are calculated by standardizing and adding each of their four components.

Exhibit D-2

General Environment and Specific Environment Intercorrelations

Variable	General Environment			Specific Environment		
	Interdependence	Volatility	Favorability	Interdependence	Volatility	Favorability
General Environment						
Interdependence	--					
Volatility	.79	--				
Favorability	.52	.19	--			
Specific Environment						
Interdependence	-.11	.02	-.24	--		
Volatility	-.07	-.05	.00	-.02	--	
Favorability	-.12	-.10	-.22	-.04	.07	--

Note: $n = 68$; $r = .24$; $\rho < .05$; $r = .31$; $\rho < .01$. (two-tailed probability)

Exhibit D-3

Context Intercorrelations

	Log of Size	Between-Unit Workflow	Task Specialization
Log of Size	-		
Between-Unit Workflow	.12	-	
Task Specialization	-.06	.23	-

Note: $n = 68$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-4

Structure Intercorrelations

Variable	Formalization	Decentralization	Within-Unit Workflow	Standardization
Formalization	-			
Decentralization	.12	-		
Within-Unit Workflow	.06	.07	-	
Standardization	.12	.63	.19	-

Note: n = 61 to 68; r = .25; p < .05; r = .32; p < .01.

(two-tailed probability)

Exhibit D-5

Group and Task Variable Intercorrelations

Variables	Cohesiveness	Task Difficulty	Task Variability	Expertise
Cohesiveness	--			
Task Difficulty	-.22	--		
Task Variability	-.08	.38	--	
Expertise	.04	-.04	.40	--

Note: $n = 68$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-6

Complexity and Group and Task Variable Intercorrelations

	Environmental Complexity	General Environment Complexity	Specific Environment Complexity	Contextual Complexity	Structural Complexity	Cohesiveness	Task Difficulty	Task Variability	Expertise
Environmental Complexity	--								
General Environment Complexity	.94	--							
Specific Environment Complexity	.01	-.05	--						
Contextual Complexity	.30	.35	-.06	--					
Structural Complexity	-.13	-.11	-.06	.02	--				
Cohesiveness	.09	.09	.21	.07	.22	--			
Task Difficulty	.08	.03	.11	.06	-.12	-.22	--		
Task Variability	.01	.03	-.05	.17	.20	-.08	.38	--	
Expertise	-.01	-.02	-.12	.20	.29	.04	-.04	.40	--

Note: n = 61 to 68; r = .25; p < .05; r = .32; p < .01. (two-tailed probability)

Exhibit D-7

Discretionary Leadership Intercorrelations

Variables	Role Clarity	Work Assignments	Rules and Procedures	Support
Role Clarity	-			
Work Assignments	.32	-		
Rules and Procedures	.49	.49	-	
Support	.49	-.02	.16	-

Note: $n = 68$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-8

Leader Behavior Intercorrelations

Variables	Role Clarity	Work Assignments	Rules and Procedures	Support
Role Clarity	-			
Work Assignments	.20	-		
Rules and Procedures	.37	.43	-	
Support	.50	.06	-.17	-

Note: $n = 68$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-9

Required Leadership Intercorrelations

	Role Clarity	Work Assignments	Rules & Procedures	Support
Role Clarity	--			
Work Assignments	.10	--		
Rules and Procedures	.33	.47	--	
Support	.22	.63	.60	--

Note: $n = 68$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-10

Lateral Leadership Intercorrelations

Variables	Pressure for Action	Network Development	Adaptation to Pressure
Pressure for Action	-		
Network Development	.31	-	
Adaptation to Pressure	.30	.06	-

Note: $n = 67$; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-11

Intercorrelations Among Different Aspects of Leadership

	Discretionary Leadership				Leader Behavior				Required Leadership			
	RC	WA	R&P	Supp	RC	WA	R&P	Supp	RC	WA	R&P	Supp
Leader Behavior												
Role Clarity (RC)	.72	.27	.35	.37								
Work AssignmentS(WA)	.35	.39	.42	.18								
Rules & Proced.(R&P)	.29	.36	.52	-.09								
Support (SUPP)	.49	.01	.08	.73								
Required Leadership												
Role Clarity	.25	.23	-.04	.28	.12	.10	-.08	.45				
Work AssignmentS	.01	.07	.23	.05	.03	.42	.24	-.07				
Rules & Procedures	.17	.16	.33	.32	.17	.50	.33	.23				
Support	.13	.13	.21	.25	.06	.33	.18	.12				
Lateral Leadership												
Pressure for Action	-.27	-.26	-.17	-.09	-.00	-.31	-.19	.03	-.04	.04	-.12	-.03
Network Development	.05	.05	.14	01	.09	.20	.13	.12	.13	.11	.25	.19
Adaptation to pressure	-.38	-.41	-.37	-.14	-.14	-.25	-.09	-.23	-.05	-.02	-.08	-.03

Note: n = 67 to 68; r = .24; p < .05; r = .31; p < .01. (two-tailed probability)

Exhibit D-12

Complexity, Group and Task Variables and Leadership Correlations

	Complexity					Group and Task Variables			
	Environmental	General Environment	Specific Environment	Contextual	Structural	Cohesiveness	Task Difficulty	Task Variability	Expertise
Discretionary Leadership									
Role Clarity	.02	.07	-.12	.07	.30	.21	-.33	-.05	.13
Work Assignments	.11	.12	-.03	.10	-.06	.06	-.15	-.15	-.04
Rules & Procedures	-.06	-.03	-.06	13	-.03	.02	-.17	-.02	.07
Support	-.12	-.06	-.11	.08	.32	.14	-.30	-.16	.44
Leader Behavior									
Role Clarity	-.08	-.05	-.11	-.07	.24	.13	-.35	-.00	.06
Work Assignments	.16	.19	-.04	.09	.01	.26	-.08	-.13	.11
Rules & Procedures	-.05	-.07	-.01	-.09	-.11	-.12	.13	-.17	-.12
Support	-.01	.02	-.18	.05	.31	.21	-.42	-.05	.39
Required Leadership									
Role Clarity	.19	.21	.09	.19	.09	.09	-.17	-.10	.09
Work Assignments	-.11	-.11	.14	-.11	.04	.05	-.04	-.02	.02
Rules & Procedures	.01	-.01	.02	.10	.06	.14	-.19	-.21	.17
Support	-.12	-.11	.00	.01	-.04	.13	-.24	-.23	-.04
Lateral Leadership									
Pressure for Action	-.01	-.00	-.03	.01	.04	-.06	.16	.11	.08
Network Development	-.06	-.03	-.24	.12	.08	-.00	-.03	-.11	-.15
Adaptation to Pressure	-.08	-.07	-.07	-.10	-.03	-.13	-.13	.00	-.15

Note: n = 61 to 68; r = .25; p < .05; r = .32; p < .01. (two-tailed probability)

Exhibit D-13

Performance Intercorrelations

Variables	Log of Error Rate	Log of Down Time	Log of Variability in Error Rate	Log of Variability in Down Time
Log of Error Rate	-			
Log of Down Time	-.18	-		
Log of Variability in Error Rate	.79	-.14	-	
Log of Variability in Down Time	-.03	.85	.03	-

Note: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Exhibit D-14

Job Satisfaction Intercorrelations

	JDI Work	JDI Supervision	JDI Co-Workers	JDI Pay	JDI Promotion
JDI Work	--				
JDI Supervision	.30	--			
JDI Co-Workers	.49	.22	--		
JDI Pay	.22	.25	.05	--	
JDI Promotion	.23	.03	.20	.09	--
JDI Total	.73	.64	.63	.52	.53

Note: n = 66 to 68; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

(two-tailed probability)

Exhibit D-15

Employee Maintenance Intercorrelations

	JDI Total	Job in General Satisfaction	Job Involvement	Intent to Leave	System Rewards	Unit Goal Congruence	System Goal Congruence
JDI Total	--						
Job in General Satisfaction	.67	--					
Job Involvement	.25	.22	--				
Intent to Leave	-.58	-.45	-.29	--			
System Rewards	.46	.50	.06	-.09	--		
Unit Goal Congruence	.64	.64	.11	-.40	.40	--	
System Goal Congruence	.39	.36	.06	-.27	.48	.60	--

Note: n = 64 to 68; r = .24; $p < .05$; r = .31; $p < .01$. (two-tailed probability)

Exhibit D-16

Correlations Between Performance and Employee Maintenance

Employee Maintenance	Performance			
	Log of Error Rate	Log of Down Time	Log of Variability in Error Rate	Log of Variability in Down Time
JDI Total	.11	-.00	.12	.02
Job in General Satisfaction	.08	-.02	.05	-.02
Job Involvement	.06	-.02	.04	-.13
Intent to Leave	.18	.08	.21	.23
System Reward	.18	-.06	.24	-.04
Unit Goal Congruence	.01	-.16	.03	-.20
System Goal Congruence	.07	-.36	.13	-.31

Note: n = 51 to 55; $r = .27$; $p < .05$; $r = .35$; $p < .01$.

(two-tailed probability)

Exhibit D-17

Correlations Between Environment and Criteria

	Environmental Complexity	General Environment				Specific Environment			
		Interdependence	Volatility	Favorability	Complexity	Interdependence	Volatility	Favorability	Complexity
Log of Error Rate	-.11	-.12	-.15	-.13	-.19	.43	.09	-.22	.14
Log of Down Time	.14	.08	.23	-.02	.14	-.03	-.12	.01	-.10
Log of Variability in Error Rate	-.11	-.17	-.08	-.18	-.18	.37	.14	-.24	.13
Log of Variability in Down Time	.07	.09	.22	-.09	.08	.09	-.10	-.15	-.12
JDI Total	-.11	.01	.11	-.08	.02	-.01	-.11	-.19	-.19
Job in General Satisfaction	-.05	-.04	.10	-.14	-.03	.13	-.03	-.12	-.03
Job Involvement	-.13	-.19	-.22	-.10	-.15	.12	-.14	.05	-.02
Intent to Leave	.01	-.02	-.08	-.08	.05	.10	.17	.03	.17
System Rewards	-.03	-.08	.05	-.12	-.02	.12	-.03	-.09	-.05
Unit Goal Congruence	.12	.11	.21	-.14	.17	-.07	.04	-.14	-.10
System Goal Congruence	.27	.29	.21	.15	.30	-.20	-.02	-.08	-.12

Note: Employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$; $r = .31$; $p < .01$. (two-tailed probability)

Performance: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$. (two-tailed probability)

Exhibit D-18

Correlations Between Context and Criteria

Criteria	Context			
	Log of Size	Between-Unit Work Flow	Task Specialization	Complexity
Log of Error Rate	-.11	-.12	-.16	-.21
Log of Down Time	.16	.11	.08	.15
Log of Variability in Error Rate	-.33	-.14	-.04	-.29
Log of Variability in Down Time	.05	.09	.06	.09
JDI Total	.17	-.01	.03	.12
Job in General Satisfaction	.11	.09	.02	.16
Job Involvement	.18	-.04	-.07	.03
Intent to Leave	-.19	-.09	-.16	-.23
System Rewards	.03	-.03	-.29	-.08
Unit Goal Congruence	.09	.05	.02	.11
System Goal Congruence	-.10	-.10	-.13	-.13

Note: Employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

Performance: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Exhibit D-19

Correlations Between Structure and Criteria

Criteria	Structure				
	Formalization	Decentralization	Within-Unit Workflow	Standardization	Complexity
Log of Error Rate	.03	-.03	.08	.12	-.02
Log of Down Time	.07	.06	.09	.17	.01
Log of Variability in Error Rate	-.05	-.15	.04	-.12	-.07
Log of Variability in Down Time	-.01	.03	.05	.12	-.05
JDI Total	.53	-.00	-.10	-.04	.43
Job in General Satisfaction	.48	-.06	-.12	-.05	.38
Job Involvement	-.04	.05	-.13	-.06	.06
Intent to Leave	-.25	.09	.09	.28	-.28
System Rewards	.42	-.14	-.03	-.23	.24
Unit Goal Congruence	.40	.06	.00	.06	.44
System Goal Congruence	.09	-.12	-.29	-.26	.14

Note: Employee maintenance: $n = 61$ to 68; $r = .25$; $\rho < .05$; $r = .32$; $\rho < .01$. (two-tailed probability)

Performance: $n = 51$ to 55; $r = .27$; $\rho < .05$; $r = .35$; $\rho < .01$. (two-tailed probability)

Exhibit D-20

Correlations Between Group and Task Variables and Criteria

Criteria	Cohesiveness	Task Difficulty	Task Variability	Expertise
Log of Error Rate	.01	.06	.06	-.13
Log of Down Time	-.20	-.02	-.06	-.15
Log of Variability in Error Rate	.00	-.06	-.00	-.09
Log of Variability in Down Time	-.29	-.02	-.01	-.27
JDI Total	.22	-.43	-.29	.32
Job in General Satisfaction	.27	-.43	-.02	.07
Job Involvement	-.01	-.03	-.02	.08
Intent to Leave	-.27	.17	.30	-.56
System Rewards	.17	-.21	-.06	-.08
Unit Goal Congruence	.42	-.34	.02	.24
System Goal Congruence	.27	-.16	-.07	.06

Note: For employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$ (two-tail); $r = .31$; $p < .01$ (two-tail).

For performance: $n = 55$; $r = .26$; $p < .05$ (two-tail); $r = .34$; $p < .01$ (two-tail).

Exhibit D-21

Correlations Between Discretionary Leadership and Criteria

Criteria	Discretionary Leadership			
	Role Clarity	Work Assignments	Rules and Procedures	Support
Log of Error Rate	-.05	-.27	-.08	-.04
Log of Down Time	.00	-.16	.25	-.20
Log of Variability in Error Rate	-.22	-.27	-.31	-.11
Log of Variability in Down Time	-.15	.00	.09	-.31
JDI Total	.48	.08	.25	.40
Job in General Satisfaction	.33	-.07	.14	.20
Job Involvement	.09	.23	.01	-.03
Intent to Leave	.31	-.07	-.07	-.38
System Rewards	.45	.09	.14	-.01
Unit Goal Congruence	.49	-.02	.07	.49
System Goal Congruence	.32	.02	-.04	.24

Note: Employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$.

Performance: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Exhibit D-22

Correlations Between Leader Behavior and Criteria

Criteria	Leader Behavior			
	Role Clarity	Work Assignments	Rules and Procedures	Support
Log of Error Rate	.02	-.07	.11	.00
Log of Down Time	.07	-.05	.18	-.21
Log of Variability in Error Rate	-.07	.11	-.12	-.01
Log of Variability in Down Time	-.02	-.21	.07	-.24
JDI Total	.47	.00	-.11	.50
Job in General Satisfaction	.42	-.07	-.06	.31
Job Involvement	.23	-.07	.18	.05
Intent to Leave	-.24	-.03	.09	-.37
System Rewards	.38	.24	.09	.14
Unit Goal Congruence	.42	.16	-.04	.55
System Goal Congruence	.29	.18	-.02	.26

Note: Employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$.

Performance: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Exhibit D-23

Correlations Between Required Leadership and Criteria

Criteria	Required Leadership			
	Role Clarity	Work Assignments	Rules and Procedures	Support
Log of Error Rate	.08	.07	.10	-.02
Log of Down Time	-.24	-.02	-.03	-.11
Log of Variability in Error Rate	.03	.06	.06	-.01
Log of Variability in Down Time	-.32	-.09	-.16	-.22
JDI Total	.11	.01	.02	-.01
Job in General Satisfaction	.04	-.05	-.07	-.06
Job Involvement	.25	.08	-.02	.10
Intent to Leave	-.24	-.07	.08	.10
System Rewards	-.00	.05	.01	-.08
Unit Goal Congruence	.26	-.06	.09	.10
System Goal Congruence	.13	.00	.05	.03

Note: Employee maintenance: $n = 64$ to 68; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

Performance: $n = 55$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Exhibit D-24

Correlations Between Lateral Leadership and Criteria

Criteria	Lateral Leadership		
	Pressure for Action	Network Development	Adaptation to Pressure
Log of Error Rate	.19	.21	.41
Log of Down Time	-.08	-.01	-.01
Log of Variability in Error Rate	.21	.08	.48
Log of Variability in Down Time	.02	.14	.15
JDI Total	.09	.04	-.14
Job in General Satisfaction	.02	-.06	-.10
Job Involvement	.06	-.01	-.03
Intent to Leave	.11	.11	.23
System Rewards	.01	.12	-.03
Unit Goal Congruence	.02	.09	-.14
Unit Goal Congruence	.04	-.02	-.13

Note: Employee maintenance: $n = 64$ to 67; $r = .24$; $p < .05$; $r = .31$; $p < .01$.

Performance: $n = 54$; $r = .26$; $p < .05$; $r = .34$; $p < .01$.

(two-tailed probability)

Convergent/Discriminant Analysis of Discretionary Leadership

Appendix A describes efforts to develop a reliable and valid measure of discretionary leadership and the procedures used to access reliability and validity. The final pilot test suggested that at least two dimensions of discretionary leadership could be measured with adequate reliability and validity. Exhibit D-26 summarizes the results of the five tests required to claim convergent/discriminant reliability and validity using a modified Campbell and Fiske approach in the present sample. Two different methods were used to measure discretionary leadership. One was a categorical method using the response categories enumerated in Exhibit C-5 the other was an overall point estimate for each dimension of leadership as in Exhibit C-5 . These were called the categorical and point methods.

Both methods passed the test for skewness and the internal reliability for the categorical method was acceptable (see Exhibit D-1). Tests 3, 4, and 5 are examined by comparing correlations. These data are in Exhibit D-25.

Test 3 is for convergence and, based on our earlier decision rule (see Appendix A), it should be found that correlations across dimensions using different methods are greater than an arbitrary cutoff of 0.4. Such is the case for two dimensions of discretionary leadership: rules and procedures and support. Test 4 is for discrimination. Correlations across a dimension using different methods

should be greater than correlations between different dimensions measured with different methods. As noted in Exhibit D-26, both the rules and procedures and support dimensions pass this test. Finally, there is a test for method variance. Correlations across a dimension using different methods should be higher than correlations between different dimensions which are measured using the same method. As before, the rules and procedures and support dimensions pass this final test. We conclude that we possess a reliable and valid measure for two aspects of discretionary leadership.

Exhibit D-25

Discretionary Leadership Convergence, Discrimination, and Method Tests for Aggregated Shift Supervisor Data (n = 70)

	Categorical Method				Point Method			
	RC	WA	RP	Supp	RC	WA	RP	Supp
Categorical Method								
RC	1.00							
WA	(.30)	1.00						
RP	(.47)	(.48)	1.00					
Supp	(.49)	(-.06)	(.16)	1.00				
Point Method								
RC	.37	.20	.34	.41	1.00			
WA	.21	.36	.27	.14	(.59)	1.00		
RP	.36	.29	.50	.17	(.61)	(.58)	1.00	
Supp	.13	-.02	.24	.60	(.54)	(.30)	(.40)	1.00

Note: RC = Role clarity; WA = Work assignments; RP = Rules and procedures; Supp = Support.

Key: Convergence Tests: Underlined correlations should be greater than 0.4 (monotrait-heteromethod r > 0.4).

Discrimination Tests: Underlined correlations within a box should be greater than other correlations in the same box (monotrait-heteromethod r > heterotrait-heteromethod r).

Method Tests: Circled correlations should be less than underlined correlations (heterotrait-monomethod r < monotrait-heteromethod r).

Exhibit D-26

Summary of Results for Discretionary Leadership Measures

Measures and Method	1 Skewness	2 Reliability	3 Convergence	4 Discrimination	5 Method
Categorical Method					
RC	OK	OK	None	With points	Poor
WA	OK	OK	None	With points	Poor
RP	OK	OK	With points	With points	With Points Pass
SUPP	OK	OK	With points	With points	With Points Pass
Point Method					
RC	OK	NA	None	With categorical	Poor
WA	OK	NA	None	With categorical	With categorical-Pass
RP	OK	NA	With categorical	With categorical	With categorical-Pass
SUPP	OK	NA	With categorical	With categorical	With categorical-Pass

Summary of Factor Analysis Results for Lateral Leadership

Lateral leadership was measured by a self report instrument which attempts to tap the leader's willingness to engage in exchanges with others at or near his/her own level. Earlier versions of the instrument had questionable internal reliability and a pilot test of an expanded version suggested four distinct factors. For the present investigation, a factor analysis was conducted to examine the dimensionality of the 30-item instrument.

Barlett's test suggested a factorable matrix and a Scree test (Gorsuch, 1974) suggested four factors might be identified (see Exhibit D-27).

Exhibit D-27 shows the unrotated factor matrix using RAO's canonical solution.* Also shown are part-whole correlations between a particular item and the additive index of items with high loadings. for three dimensions. While four dimensions were factorally identified, only three yielded an additive index with adequate internal consistency. These three factors were labeled according to their a priori dimensions--(I) pressure for action, (II) network development, and (III) adaptation to pressure. The fourth dimension was dropped from further consideration. A high score reflects a more favorable attitude toward increased leader activity in each of the dimensions.

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*The factor structure was clear without rotation. Trafton (personal communication) indicates that the unrotated matrix is appropriate where factors utilize summed items rather than factor scores. Such was the case here.

Exhibit D-27

Factor and Item Analysis for Lateral Leadership (n = 67).

Item No.	Factor I Loading	Factor I Part-Whole[a] Corr.	Factor II Loading	Factor II Part-Whole[a] Corr.	Factor III Loading	Factor III Part-Whole[a] Corr.	Factor IV Loading	h^2
1	.64	.58	.04		.08		-.15	.61
2	.60	.53	-.04		.11		-.14	.66
3	-.24		.17		.02		-.41	.47
4	.03		.17		.01		.22	.54
5	-.19		.00		-.64	.55	-.06	.63
6	.64	.60	-.42		.22		-.01	.68
7	.62	.57	-.46		-.25		.07	.70
8	.75	.66	-.24		-.28		.13	.77
9	-.23		.09		.35	.28	-.09	.55
10	-.13		-.07		-.01		.08	.49
11	-.28		-.20		-.55	.39	.21	.72
12	-.36		-.36	.43	.09		.05	.51
13	.33		.72	.66	-.20		.13	.71
14	.27		.57	.47	-.16		.11	.76
15	.10		.12		-.14		.37	.46
16	.44	.38	.06		.31		-.37	.57
17	.04		-.02		-.15		-.20	.60
18	.17		-.34	.31	.06		-.28	.62
19	-.32		-.29	.40	-.32		.20	.66
20	-.20		-.18		-.20		.36	.54
21	-.12		.08		.15		.17	.40
22	.27		.23		-.48	.48	.37	.67
23	.33		.18		-.55	.56	.23	.65
24	.42	.31	.26		.25		-.28	.48
25	.33		.06		.04		.35	.51
26	.01		-.21		.19		.16	.41
27	.38		.29	.46	.31		.15	.62
28	-.32		.36	.28	-.08		.14	.51
29	-.01		.13		-.17		-.44	.57
30	.04		-.12		-.05		-.28	.49
λ	4.52		2.84		2.56		2.32	
Percent of Variance	15.1		9.5		8.5		7.7	

[a]Corrected for overlap between item and composite index.

I = Pressure for action.
II = Network development.
III = Adaptation to pressure.